ISRAELI MANAGEMENT OF WATER RESOURCES

A STORY OF NATION BUILDING, NATURE TRANSFORMATION, AND ALIENATION OF PALESTINIANS FROM THEIR ENVIRONMENT

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ABSTRACT

Since the early Zionist settlement project in Palestine, water resource management systems have been employed by the Israeli nation-building project. This research explores the development of Israeli approaches to water resource management that enabled the implementation of spatial planning patterns and water infrastructure projects. I argue that this implementation has led to a nation-building project that pivots around two central issues; the first is controlling the movement and livelihoods of Palestinian people while detaching them from their natural environment, as discussed through the case of Al Battouf Valley (a Galilean region). The second is the transformation of nature where Israel sought to control nature in the service of the nation-state.

BIOGRAPHICAL SKETCH

Lama Shehadeh is a Palestinian Fulbright scholar receiving her master's degree in Regional Planning from Cornell University (2019). She is an architect, holding a Bachelor of Architecture degree from the Technion in Haifa city. She has practiced both architecture and planning.

Lama grew up in a small Galilean village called Kafr Yassif. Living in an unplanned dense village that lacks essential services and public spaces, she became eager to explore cities and planning. She is interested in spaces of conflict and in how politics, power, and colonialism form the living space, shape the natural environment, and drive formal and informal growth.

To those Palestinians who remained and painfully witnessed the transformation of their homeland, and to those who are denied the right to return and see it.

ACKNOWLEDGMENTS

For me, this research was not just an academic project, rather, it was a journey of learning and exploring one of the many layers of my personal background that intersects with my professional career. In this motivating process, I had the pleasure to be advised by my two supportive advisors, Professor Neema Kudva and Professor Ross Brann. Our discussions, their thoughts and inputs, their professionalism, and their unique perspectives have been a remarkable resource throughout the way. They have contributed not just to a better research paper, but also to my better understanding of the larger issues that this research touches on.

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Finally, I owe a debt of gratitude to those who have taught me the most- the local people from my community. Whether throughout this research as interviewees and as informal contributors, or throughout the course of life. Every small detail they have shared with me has broadened my horizon and widened my vision.

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LIST OF ABBREVIATIONS

CBS - Israeli Central Bureau of Statistics

IDF - Israeli Defense Forces

JNF- Jewish National Fund

JVA- Jordan Valley Authority

KKL- Keren Kayemet Leyesrael

SWC - The Saline Water Carrier

NWC- National Water Carrier

TVA- Tennessee Valley Authority

UN- United nation

PREFACE

“You distanced yourself from yourself.
So that you might remain on the land.
You will remain.
(People were useless … the land was useless)
But you'll dwell on.
And in the land, there is nothing, nothing but you
and what remained of time's struggles
after the miserable seasons' removal
***
Sadder than water
and clearer than the summer sun.
But the ripeness of the spikes of wheat
chooses its appointed time, after the barren seasons.
Therefore, plead for a loaf of bread
from your local relief agency -
forget the rest of your meal for a while.
Clear up your appraisal: day by day.
Month by month. And year by year.
Make clear the sudden atmosphere
before the explosion of your call.
You are the caller and you are the called.
You went up in flames. Were extinguished. Began.
You retreated. And discovered the land.
And then you lost it.
Sadder than water.”

Sadder Than Water | **Samih Al-Qasim**.

Translated by: Nazih Kassis

"تغرّبتَ منك. لتمكث في الأرض

أنت ستمكث

(لم ينفع الناس.. لم تنفع الأرض)

لكن ستمكث أنت،

ولا شيء في الأرض، لا شيء فيها سواك،

وما ظلّ من شظف الوقت،

بعد انحسار مواسمها البائسة

***

أشدّ من الماء حزنًا

وأوضح من شمس تمّوز. لكنّ نضج السنابل

يختار ميعاده بعد عقمِ الفصول

إذن فالتمس في وكالة غوثك شيئًا من الخبز

وانسَ الإدام قليلًا.. تحرّ التقاويم: يومًا فيومًا

وشهرًا فشهرًا. وعامًا فعاما. تحرّ المناخ المفاجئ،

قبل انفجار ندائك. أنت المنادي وأنت المنادَى

وأنت اشتعلت. انطفأت.. ابتدأت

انكفأت.. وأنت اكتشفت البلاد.. وأنت

فقدت البلاد

أشدّ من الماء حزنًا"

سميح القاسم |أشدّ من الماء حزنًا

Introduction

Among the many aspects of spatial planning, water resource management systems are one of the central tools that secured the establishment of the Israeli nation-state. They were employed politically since the early Zionist settlement project in Palestine1. For achieving the nation-building project, the Israeli management of water resources defied nature and transformed its order, even as it detached native Palestinians, citizens of Israel2, from their natural environment.

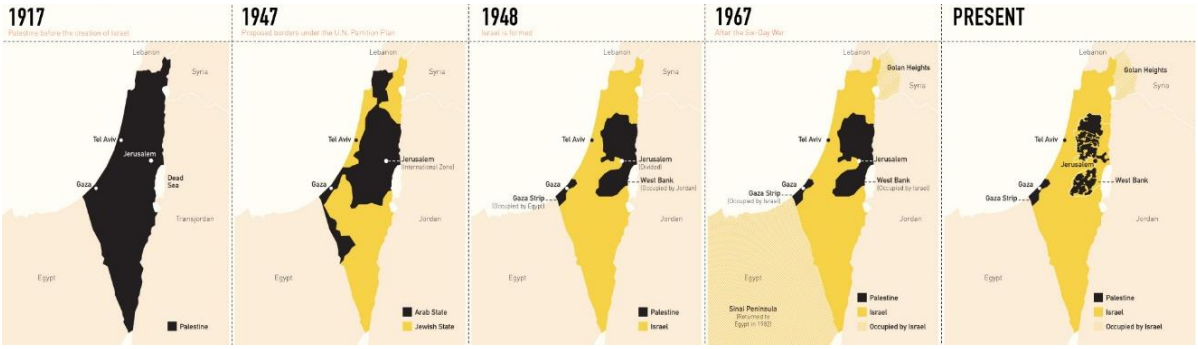


Figure 1: Borders of Israel-Palestine.
From historic Palestine geography governed by the British Mandate, through the United Nation (UN) partition plan in 1947[3], to the establishment of Israel in 1948, to the six-days war's result in 1967 until today.
Source: Palestine Portal

Soon after I began my research on Israeli water resource management systems, I interviewed an old Palestinian couple in their house in Arraba. Arraba is a Palestinian town in the Galilee that falls within the northern district of the Israeli state. The couple are peasants who own agricultural land in Al Battouf Valley, through which the Israeli National Water Carrier (NWC) project cuts. In the 1950s, when Arraba and all Palestinian villages were military governed,

[1] The territorial boundaries of Palestine and Israel have been shifted many times during the past decades (See Figure 1). In this paper when I talk about the period before 1948 (the establishment of Israel) I will talk about historic Palestine- the area under the British Mandate between 1918-1948.
[2] Palestinians, who remained within the borders of the newly established country of Israel after 1948, have got an Israeli citizenship. However, they are not treated as equal citizens and are considered a demographic and national threat to the Israeli country. This paper will touch on some aspects of this issue.
[3] According to the partition plan a Jewish state would cover more than 50% of Palestine's lands, while Jews in Palestine were only 33% of the total population.

the man was temporarily expelled because he resisted the digging of a water canal for the NWC through his land. During the interview, as we talked about this water project that crosses their lands but neither irrigates it nor solves its flood problems, it started to rain. The woman started to pray: "Please God, stop the rain". A peasant, living on rainfed agriculture, was praying for the rain to stop.

My research is driven by trying to understand what drove this fear of rain, the most desired natural event in any semi-arid region. What happened through the years to create this alienation between peasants and nature? How did Israeli water management projects, transform nature to build the Israeli nation? And what happened to Palestinians, citizens of Israel, as a result of this?

In this research paper I study the implementation of water resources management systems that served the Israeli nation building project since the British Mandate in Palestine. I start by examining two main Israeli approaches to water, the first is the abundance of water theory that justified Jewish immigration to Palestine during the British Mandate (Chapter 1). The second approach is the scarcity of water discourse that was employed by the new Israeli state, starting in the 1950s, to establish a centralized water system and a state monopoly over nature (Section 2.1). Together, these two stages, undergird the Israeli nation-building project and enabled spatial planning patterns and water infrastructure projects evident today (Sections 2.2-2.3). Water resources management was a primary political instrument to achieve the Israeli nation-building project and it was built on two central pivots; the first was controlling the movement and livelihoods of Palestinian people and detaching them from their natural environment, as discussed through the Al Battouf Valley case[4] (Section 2.4). The second was the transformation of nature (Sections 2.5 to 3) where, Israel, similar to many other modern countries, sought to control nature in the service of the nation-state.

[4] This research focuses on Palestinians citizens of Israel and does not touch on water issues in the West Bank or Gaza.

Worster (1992) has discussed in some detail, how massive water projects and scientific expertise served to establish bureaucratic control even in the 'democratic' West. Katie Meehan (2014), quoting Karl Wittfogel (1957), explains the rise of centralized authority in 'despotic' regimes through the emergence of dams, canals, and irrigation technologies. She writes,

> State agencies used scientific instruments and reports to render water legible to administration and planning: maps were drawn, data were collected, deficiencies were calculated, wetlands were drained, rivers were dammed, and reservoirs built to 'conserve' water for navigation and beneficial uses—largely at the behest of a capitalist state (Meehan, 2014).

This control over nature and water was not separate from control over local Palestinians. In the context of the U.S., historian Edward E. Baptist (2010 and 2016), records the approach towards nature by which settlers to North America transformed the homeland of its indigenous people into land as a resource to be exploited for the sake of territorial control and economic development. This geographical transformation, along with the system of slavery, created the two main "commodities" that later generated the wealth of the settlers: land and human bodies. Owning this commodity capital was essential for the establishment of the capitalist system and its current characteristics. Although the American system of slavery was not established in Palestine, two "commodities" were created and controlled: human (Palestinian) bodies and natural resources that were transformed for the national project benefiting the privileged in power.

1. The Water Issue Under the British Mandate 1918-1948

The Zionist movement[5] started envisioning water projects in Palestine decades before the official establishment of the Israeli state in 1948. Some of the projects focused on the local management scale for serving the Jewish immigrants' settlements in Palestine and others were at a nation-wide scale that set the ground for a larger immigration project. The chapter examines the water issue during the British Mandate. It discusses the Israeli-Palestinian conflict prior to the establishment of the Israeli state and how water played into this conflict.

1.1 Balfour Declaration 1917

Palestine was governed by the Ottoman Empire for four centuries before the Empire's collapse as a result of the First World War in 1918. The British took over Palestine through the Occupied Enemy Territory Administration until 1920, then a civilian administration, headed by a High Commissioner, replaced the military administration. In 1922, The Great Britain administrative forces achieved legitimacy for their continued control by obtaining a mandate from the League of Nations.

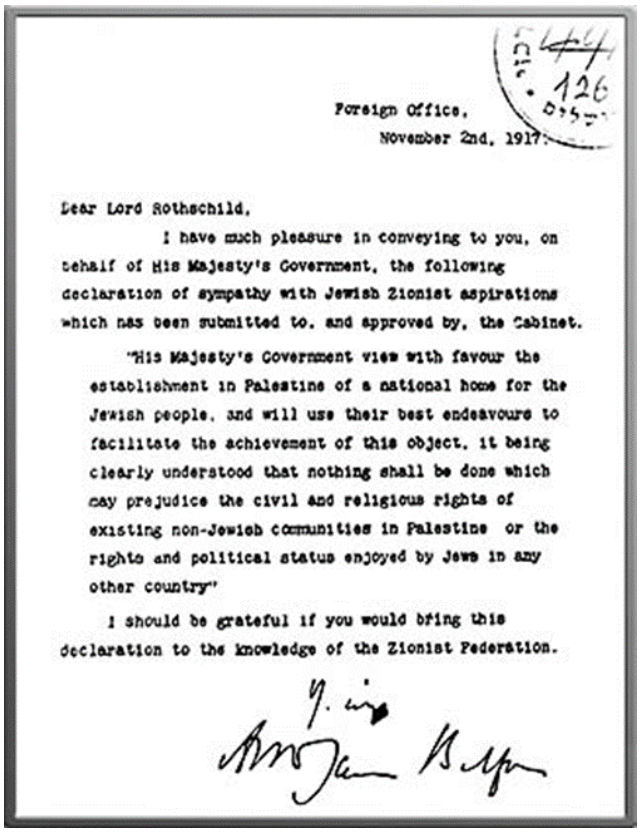
Discussions, agreements and debates dealing with the partition of the Ottoman Empire started right after the end of the First World War (e.g. the Sykes–Picot Agreement of 1916, Balfour Declaration of 1917, the 1915–16 Hussein-McMahon Correspondence, and League of Nations Mandate). During this unstable era, in November 1917, the British government issued a public statement announcing support for the establishment of a "national home for the Jewish people" in Palestine:

> His Majesty's government view with favour the establishment in Palestine of a national home for the Jewish people, and will use their best endeavours to facilitate the achievement of this object, it being clearly understood that

[5] A nationalist movement of Jewish people that emerged in the late 19th century in Central and Eastern Europe as a result of the risen anti-Semitism, and along with other nationalist movement around the world. It supported the establishing of a Jewish homeland in Palestine and supported Jewish immigration there.

> nothing shall be done which may prejudice the civil and religious rights of existing non-Jewish communities in Palestine, or the rights and political status enjoyed by Jews in any other country. (Balfour, 1917)

This letter (See Figure 2) from the United Kingdom's Foreign Secretary, Arthur Balfour, to Lord Rothschild, a prominent Zionist leader, is known as The Balfour Declaration. It is considered to be the first public support of the Zionist Organization by the British Government, and the first pledge for building a "Jewish national home" in Palestine, where the Jewish population made up 7.9% of the at the time (See Figure 3).



Foreign Office,
November 2nd, 1917.

Dear Lord Rothschild,

I have much pleasure in conveying to you, on behalf of His Majesty's Government, the following declaration of sympathy with Jewish Zionist aspirations which has been submitted to, and approved by, the Cabinet.

"His Majesty's Government view with favour the establishment in Palestine of a national home for the Jewish people, and will use their best endeavours to facilitate the achievement of this object, it being clearly understood that nothing shall be done which may prejudice the civil and religious rights of existing non-Jewish communities in Palestine or the rights and political status enjoyed by Jews in any other country"

I should be grateful if you would bring this declaration to the knowledge of the Zionist Federation.

Figure 2: Balfour Declaration 1917

The term "national home," that was promised to the Zionist Organization through The Balfour Declaration, was left internationally unrecognized (Makovsky, 2007, p.76). Despite the ambiguity of the term, Zionist leaders perceived it, bolstered by the context of the

declaration, to intend the formation of a Jewish state. Weizmann[6], for example, considered the development of a state to be a way for the Jews to slowly become a majority group in Palestine. Furthermore, Balfour himself, privately announced in 1918: "My personal hope is that Jews will make good in Palestine and eventually found a Jewish State" (Makovsky, 2007, p.77). On the other hand, some argue that rather than representing a claim for an independent state, the declaration embodied a claim that was consistently made from the very first days of the Zionist movement: that a European protected space in colonial territory will solve the European (and globalizing) Jewish problem (Loevy,2017). This ambiguity as well as the promises by the British Mandate for self-determination for Palestinians caused a great deal of confusion and brought the region to a heated tension between the three major players; the colonial British government, Palestinians seeking self-determination and independence from the colonial government, and the Zionist movement seeking a Jewish state.

The next two sections (Sections 1.2 and 1.3) discuss how the management of water resources and infrastructure projects served Jewish immigration to Palestine.

1.2 Jewish Immigration as an Economic Question

Despite British support for building the Jewish national home in Palestine, many debates around Jewish immigration policy started between the Zionist Organization and the British during the British Mandate. The capacity of water resources was one of the main considerations to achieving the desired Zionist immigration volume.

After Balfour's declaration and under the British Mandate, Jewish immigration to Palestine grew significantly, from 7.9% by 1918 to 33% by 1946 as shown in Figure 3.

[6] A Zionist leader and the first president of Israel.

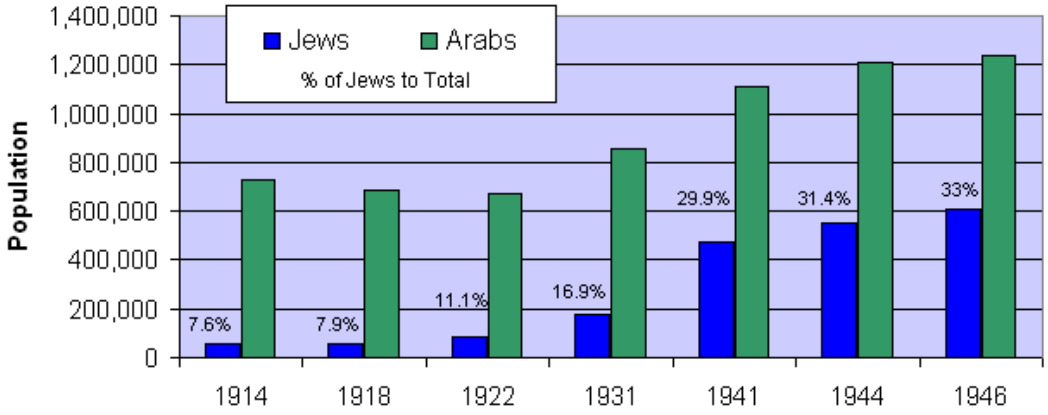


Figure 3: The Jews and Arab population of Palestine (1914-1946).
Source: israelipalestinian.procon.org

The Zionist movement advocated for immigration of millions of Jewish people to Palestine. In 1922, the Secretary of State for the Colonies, Winston Churchill issued a White Paper, a government policy document, which reiterated British support for the Balfour Declaration, but also attributed tensions in Palestine to "exaggerated interpretations" of the Declaration, clarifying its intent to mean that while the "Jewish national home" is to be established in Palestine, that does not mean Palestine is to be wholly Jewish. It stressed that the Jewish immigration "cannot be so great in volume as to exceed whatever may be the economic capacity of the country at the time to absorb new arrival." (Churchill, 1922)

This document, issued by the British, altered the immigration discussion to a technical question (Alatout, 2009) by referring to the economic capacity of Palestine rather than dealing merely with the political intention.

Later, in 1939, a new British White Paper was issued by Malcolm MacDonald, the Secretary of State for the Colonies. Following the conclusions of the Peel[7] and Woodhead[8]

[7] A British commission of inquiry that was appointed in 1937 to survey the situation in Palestine. It recommended the partition of Palestine into three parts: a Jewish state, a territory under British administration and an area to be annexed to Transjordan (Peel, 1937).
[8] It was a technical commission that drew up 3 detailed plans for the partition of Palestine following the Peel Commission report. Its report was issued in 1938. (Woodhead, 1938)

Commissions, as well as the ongoing Arab Revolt, the paper rejected the idea of partition of Palestine and suggested the establishment of an independent state in Palestine, with Arabs and Jews sharing the government, all within ten years. (MacDonald, 1939).

> For each of the next five years a quota of 10,000 Jewish immigrants will be allowed […] if economic absorptive capacity permits. In addition, as a contribution towards the solution of the Jewish refugee problem, 25,000 refugees will be admitted as soon as the High Commissioner is satisfied that adequate provision for their maintenance is ensured. […] After the period of five years, no further Jewish immigration will be permitted unless the Arabs of Palestine are prepared to acquiesce in it. (MacDonald, 1939).

This Paper severely limited Jewish immigration to Palestine, suggesting that it is unsustainable and that it would soon overwhelm the available water resources for agriculture and other uses. British economists believed that the entire geographic area of Palestine could hold no more than two million people. So, it limited the number of Jewish immigrants to 75,000 over five years, as opposed to the plan of absorbing one million immigrants to Palestine within 18 months that was suggested by David Ben-Gurion, the political leader of the Jewish community in Palestine (Siegel, 2015).

While the two papers (1922 and 1939) outraged Zionist leaders, they also represented an opportunity to alter the discussion around Jewish immigration to Palestine to a technical issue. Zionists leaders insisted that the absorptive capacity of Palestine should be the only legitimate factor in determining the Jewish immigration policies. Technical reports, issued by the Zionists to justify the extension of Jewish immigration to Palestine, included a range of Zionist action in Palestine: Farming, industry, mineral resources, and, especially important, water research and use (Alatout, 2009).

Technicizing the question - a term used by Alatout (Alatout, 2009) to mean “tying it to measurable absorptive capacity” - placed immigration policies firmly in the hands of the Mandatory Government rather than of the Zionist movement. However, the Zionist

movement saw this as an opportunity to contest British estimates of Palestine's absorptive capacity as technically unsound (Alatout, 2009). Alatout argues, according to the theorists of power such as Foucault and Science, Technology and Society scholars especially Jasanoff, that the technical discourse around water was already shaped by politics, it is a framework of power, a resource for declaring winners and losers. He adds that by technicizing the question of immigration, it was shifted to the number of immigrants rather than whether immigration should be allowed at all and under whose authority.

This stage, following the Papers, was the first stage of politicizing water resources in Palestine, and the White Paper of 1939 is seen as a starting point in understanding the modern State of Israel's approach to managing water resources (Seigel, 2015). To answer the question of necessary water capacity for the hoped Jewish immigration, the Zionist movement worked on establishing different plans and projects to make the "national Jewish home" possible; the many research projects and many plans clearly suggested that water in Palestine is an abundant resource that can meet the Zionist immigration needs.

1.3 Water's Abundance and Projects: Justification for Jewish Immigration

Natural water resources are among the debated issues when it comes to the natural absorptive capacity of Palestine, that is a semi-arid climate zone. The rainwater and the melting snow (mainly from Mt. Hermon) enter the upper Jordan River and flow into Sea of Galilee (Lake Tiberias), shaping the main natural surface-water resource in Palestine. The lake is also fed partly by underground springs. Another two natural-water resources are the Coastal and the Mountain aquifers (see

Figure 4). The average annual natural recharge of the basins is about 1800 mcm/year (million cubic meters per year), more than 80% of this is shared by three basins: The upper Jordan

River and the Sea of Galilee (600 mcm/year), the Mountain Aquifer (660 mcm/year), and the Coastal Aquifer (240 mcm/year) (Schwarz et al., 2015).

Those sources are primarily dependent on annual replenishment through rainfall. This is problematic because of various factors, the most important being the short-term climatic variability and the possibility of longer-term periods of significant declines resulting from prolonged drought (Lithwick, 2000).

Figure 4: Water resources in Israel-Palestine.
Source: https://water.fanack.com/israel/water-resources/

At the time the British White Paper was issued in May 1939, water was managed mostly at the local scale and mostly constituted of wells' dug in towns and farms, and was a balkanized, 'district-by-district' affair with very little sharing or pooling of common resources (Seigel 2015). This approach to water was not sufficient to meet the Zionist's expansion plans,

especially given that most of the available water volume is in the North. The North was far from the planned metropolis of Tel Aviv and from the desert of the Negev, the desired area that David Ben-Gurion was dreaming of settling (see section 2.2.1). Hence, a more convincing plan had to be presented as a counter argument for the White Paper.

Under these conditions, the abundance theory (Alatout, 2009), on water availability, evolved into technical water projects' proposals and hydrological scientific discussion (See Alatout, 2009), and biblical arguments to justify the Jewish immigration.

Simcha Blass is a Polish Jewish hydrological engineer that immigrated to Palestine, and a water consultant for the Jewish Agency in Palestine. In 1939 he was asked to create a "fantasy water plan" to be presented to the British to justify expanding the number of Jewish immigrants. The many drafts of Blass' plan suggested 1) the abundance of groundwater in the Negev desert, 2) pumping water from the Yarkon River[9], and 3) developing a massive infrastructure project to carry the water from the water-rich north to the center and the south. He included the Yarmouk River (in Jordan today) and the Litani River (Lebanon) in his plan, as the map on the cover book shows(see Figure 5); His plan crossed the boundaries of today's Israel and suggested reaching Lebanon, Jordan, and the West Bank. Blass' plan, became the first draft of the Israeli National Water Carrier (explained in detail in section 2.3 below) and was part of Ben-Gurion's negotiation with the British about the Jewish immigration to Palestine (Seigel 2015).

[9] A river in the central region of the country that flows into the Mediterranean Sea.

Figure 5: A Scheme of the water carrier project in Blass' book "Water Treasures in Israel", 1942.

Another support to the Zionist argument of water abundance was provided by the American soil scientist Walter C. Lowdermilk, who used both scientific and biblical arguments to prove the high absorptive capacity of "Palestine, the Land of Promise"[10]. Lowdermilk, who worked at the American Tennessee Valley Authority (TVA), was sponsored by the Mandate Government to research the construction of an airport (Alatout, 2009). He extended his visit

[10] A biblical title of Lowdermilk's book that was published in 1939.

and visited three hundred farms, settlements, and outposts of the Yishuv[11] (Seigel, 2015). Lowdermilk was a member of the mainly Christian pro-Zionist American Palestine Committee, and a friend of Blass. The Jewish Agency capitalized on this opportunity and provided Lowdermilk with all possible assistance during his visit. It ended with the publication of his best-seller book "Palestine, Land of Promise" in 1939 which became the most influential study of Palestine's water availability and use during the Mandate period (Alatout, 2009). It also had a deep impact on the embryonic thoughts about the Zionist effort among US policy elites (Seigel, 2015).

In his book, Lowdermilk proposed a nation-wide infrastructure project, driven by the model of the TVA project he was familiar with[12]. He suggested diverting the Jordan River from the North to the desert of the Negev in the South, and proposed the JVA, the Jordan Valley Authority. According to Lowdermilk, this project could support a population of 4 million people in Palestine. This technical project was backed up with another two arguments that supported the notion of abundance; The first was that "the absorptive capacity of any country is a dynamic and expanding conception. It changes with the ability of the population to make maximum use of its land, and to put its economy on a scientific and productive basis." (Lowdermilk, 1939). This argument presented the Arabs as pre-modern inhabitants who could not make beneficial use of the great land[13], vis-a-vis the Jewish immigrants, whose work was remarkable[14]. Further, his second argument for establishing the water abundance theory was the biblical stories about Palestine, depicting it as a green and wealthy land.

[11] The Jewish community in Palestine prior to the establishment of Israel.

[12] "The Tennessee Valley Authority has set the pattern whereby agriculture, power and manufacturing can be developed in a co-ordinated way in the highest interests of the people in a given area. This pattern should be applied to Palestine. The drainage area of the Jordan Valley, the Hauran and the maritime slopes of Palestine, has the physical features and resources that set the stage for a great reclamation project" (Lowdermilk, 1939, p.24)

[13] For example: "Suspicious-looking Arabs stood around their tents […] We were careful to travel faster than a racer camel, in order that news of our approach should not be passed to terrorist groups along the roads." (p.4), or "Backward native populations and political and social decay are the usual result when land is impoverished" (p.21)

[14] For example: "The Jewish settlers in Palestine has similarly transformed "bad lands."" (p.221)

2. Building the National State of Israel: From a Discourse of Scarcity to Drought

In 1948, the Israeli-Arab war came to an end with the establishment of Israel (see Figure 1). 700,000 of the local Palestinians were expelled or fled, and more than 500 of their villages were demolished. Some Palestinians whose villages were not demolished, or who were displaced internally, remained within the newly declared borders of the new county under military governed areas. With this takeover of Palestinian land, the new Israeli state started to establish a nation, both on the spatial and the structural level.

This chapter will examine the shift of the Israeli state's discourse of water abundance into a water scarcity discourse and its political implementation at the scale of a national project (section 2.1). Then, I will introduce how spatial planning policies (section 2.2), supported by the water management system and infrastructure (section 2.3), shaped the national state of Israel, detached Palestinians' from their lands (section 2.4), overlooked nature, and led to an actual water drought (section 2.5).

2.1 Discourse of Scarcity

As we saw in the previous chapter, the discourse of abundance was the main argument among Zionist engineers and politicians during the period of the British Mandate. Alatout argues that in politically constructing the water resources of Palestine as abundant, in scientific and political discourse, a particular politics of Jewish immigration was allowed. However, this discourse of abundance changed dramatically after the establishment of Israel in 1948, and instead, became a discourse of scarcity.

By the time of declaring the establishment of Israel in 1948, the population of the new country was only around 872,000 people. Only 13% of the natural water resources were used, then, for agricultural use, drinking, and urban consumption, and water was supplied, on a local level, either from close surface resources or wells (Schwarz et al., 2015). However,

the following period of development of the newly-established country was shaped by rapid development of agricultural, industrial and urban sectors. Within 10 years, the population size doubled due to immigration (See Figure 32), and the demand for water increased. This required a national level of operation and switched the discourse of abundance into a discourse of scarcity. Water management was not about "creating" water resources, rather it was about managing the existing water resources. According to Alatout (2008), the new discourse of water scarcity helped to construct the following:

> water resource scarcity as `fact'; centralized policy-making institutions as most `efficient'; centralized technologies as `appropriate'; the national space as the only source of identity; the national scale of water management as `necessary'; a strong and centralized state as `legitimate'; legal precedents for the use of state apparatus for surveillance, discipline, and control over water resources; and, consequently, a form of citizenship that is seen as at once heroic and disciplined. (Alatout, 2008, p.959)

The first step towards managing water resources was the legislation of The Water Law.

2.1.1 The Water Law

A central shift in dealing with water management was with the legislation of the Water Law in 1959, establishing that all the water resources in the country are publicly owned. This removed all private or collective property rights over water resources.

"Chapter One: Preliminary

Water resources and purpose thereof Definition:

1. The water resources in the State are public property; they are subject to the control of the State and are destined for the requirements of its inhabitants and for the development of the country.

What are water resources:

2. For the purposes of this Law, "water resources" means springs, streams, rivers, lakes and other currents and accumulations of water, whether above ground or underground, whether natural, regulated or made, and whether water rises, flows or stands therein at all times or intermittently, and includes drainage water and sewage water.

Private person's right to water:

3. Every person is entitled to receive and use water, subject to the provisions of this Law.

Relationship between land and water:

4. A person's right in any land does not confer on him a right in a water resource situated therein or crossing it or abutting thereon; but the provision of this section shall not derogate from the right of any person under section 3.

Water resource must not be depleted:

5. A person's right to receive water from a water resource is valid so long as the receipt of water from that water resource does not lead to the salination or depletion thereof.

Linking of right:

6. Every right to water is linked to one of the to purpose water purposes enumerated hereunder; the right to water ceases upon the cessation of the purpose. The purposes are:

(1) domestic purposes; (2) agriculture; (3) industry; (4) handicraft, commerce and services; (5) public services.

Applicability

7. For the purposes of this Law, it shall be immaterial whether a right to water was created by law including this Law or by agreement or custom or in any other manner, or whether it was created before or after the coming into force of this Law." (Water Law, 1959)

In addition to the recognition of water as a public natural resource, the law established the centralized structure to manage it. Under the 1959 law, the Water Authority, a central government agency, was created alongside a public planning design company- Tahal and an infrastructure building and water supply company- Mekorot. Together, the three agencies, were responsible for the monitoring, regulation, and allocation of water; how much water will be extracted in each time period, from each source, and how much water each user will get in this time period. It established a 'natural monopoly', as described by Feitelson (2013). A comprehensive metering system was put in place, and a company established by the pre-state Zionist organizations (Mekorot) was designated to operate this system. The decision-making process was largely opaque as no record of it was made available to the public (Feitelson, 2013). In addition, water is considered a security issue since it is a scarce natural resource in the region, and many water sources are shared internationally. Therefore, any public discussion through the media about amounts or projects had to pass governmental censorship.

2.2 The Spatial Planning of Israel

Through the two stages described above (pre and post-state in sections 1 to 2.1), water discourses of abundance and scarcity were mobilized for the building of the national Jewish home. First, it legitimized Jewish immigration to Palestine, the building of new settlements, and selected agricultural development. Later, the discourse around water management

constructed the centralized water management system and infrastructure that was an essential step of building the modern country and connecting all its segments into one nation. The newly developed centralized water management system enabled control over the allocation of water resources to support strategic land-use planning patterns in building the nation. This section introduces Israeli spatial planning strategies (sub-sections 2.2.1 to 2.2.6) that prioritized national and security objectives, treated land as a frontier, and disregarded natural resources capacity. Within a few decades, those spatial planning strategies, that required a supply of water and a highly developed infrastructure system, led to over-exploitation of water resources and drought.

**

Within a few years of its establishment, the state of Israel claimed ownership over 93% of the land within its pre-1967 borders. Most of those lands were abandoned Arab property[15], lands that were not previously claimed (according to the British law of ownership claiming), or lands that were owned by organizations associated with the pre-state Yishuv such as the Jewish National Fund (JNF)[16] (Evans,2006). This high percentage of nationally owned lands enabled planning to be tightly regulated by Israeli government policy (Orenstein and Hamburg, 2009) and allowed for implementation of the national strategic objectives (Evans, 2006).

In 1949, one year after the establishment of the state of Israel, the Prime Minister, Ben-Gurion, presented the Defense Service Law to the Parliament. This law included several

[15] The Absentees' Property Law, 1950: "Defines persons who were expelled, fled, or who left the country after 29 November 1947, mainly due to the war, as well as their movable and immovable property (mainly land, houses and bank accounts etc.), as "absentee". Property belonging to absentees was placed under the control of the State of Israel with the Custodian for Absentees' Property. The Absentees' Property Law was the main legal instrument used by Israel to take possession of the land belonging to the internal and external Palestinian refugees, and Muslim Waqf properties across the state." (Adalah, 2019)

[16] The JNF was established in 1901 during the 5th Zionist Congress. It was responsible for purchasing land in Palestine to manage it and distribute it to the Jewish immigrants. (Amir and Rechtman, 2006) later, it was re-established as an Israeli company (named KKL- Keren Kayemet Leyesrael) and most of its land were transferred to be managed by the Israel Land Administration governmental agency (ILA). Today JNF-KKL owns %13 of the total area of Israel.

civilian components that included absorbing immigrants and spreading the Jewish population through the county. The strategic goals were to address demographic liabilities in key areas and hostile border regions (Evans, 2006). Hence, the land-use planning policies prioritized Jewish population distribution across the country (Evans, 2006, Orenstein and Hamburg, 2009, Newman 1989, and Weizman, 2004). The dispersal policies were designed to populate lands, fortify borders against neighbors, preempt efforts of Palestinian refugees to reclaim the land, and secure land holdings for Jewish immigrants against the Palestinians citizens of Israel (Orenstein and Hamburg, 2009).

This political-demographic spatial planning approach was rooted in Zionist settlement policies[17] and continued after 1948. It included implementation measures such as a population dispersal policy, a low-density pattern of settlement, agricultural settlements, border settlements, settling in the desert, developing industry in the periphery, settling immigrants according to national priorities, etc. The following sub-sections will describe some of the implementation measures undertaken as part of the spatial planning in Israel.

2.2.1 Blooming the Negev

The Negev (Al-Naqab), a desert and semidesert region in southern Israel (see Figure 6), occupies nearly two-thirds of Israel's land area (21,671 km^2) (Portnov and Safriel, 2004), with an average rainfall of 50–250 mm per year (Orenstein and Hamburg, 2009). The Negev area is bordered by Jordan to the east, the Red Sea to the South, and Sinai Peninsula of Egypt to the west. It also shares borders with the West Bank and Gaza strip.[18]

[17] The desire to spread the Jewish population to claim territory was a main determinant of the Zionist settlements pattern, especially after the1937 British Royal (Peel) Commission Plan for the partition of Palestine. When the Zionist leadership realized that the borders of the emerging Jewish state would be decided based on the Jewish settlements' locations (Orenstein and Hamburg, 2009)

[18] Those are the 1948 borders of the Negev. Today's Israel's borders with the West Bank are not defined.

Figure 6: The Negev, the southern district of Israel.
Source: https://en.wikipedia.org/wiki/File:Southern_District_in_Israel.svg

Before 1948, approximately 100,000 Bedouin lived in the area. During the 1948 war, the vast majority of them were displaced or expelled (Orenstein and Hamburg, 2009) and only around 11,000 remained within the new declared borders of the state of Israel (Abu Ras, 2012). Although the region was populated, it was viewed by the Zionist leaders, as a barren wasteland that lacked, according to Ben-Gurion, "Jews and water" (Lolordo, 1998).

Ben- Gurion saw the settling and the "blooming" of the Negev as a national, security, and economic mission for stabilizing and protecting the Jewish state. As such, the empty desert was conceived as a security threat to the new state (Alatout, 2008) as well as a fear of demographic threat to national sovereignty and takeover of state land by the local Bedouin population (Orenstein and Hamburg, 2009).

Ben-Gurion was among the most important Zionist leaders to stress towards settling the Negev, arguing that “it is in the Negev that the creativity and pioneer vigor of Israel shall be tested”, and that it is “one of the Jewish nation's safe-havens.” In his article “Southward”, that he wrote in 1956, he argued that the Negev was the place where the Hebrew nation was born. He referred to the biblical stories of Abraham story and believed that the ancient biblical injunction was also relevant in the days of the New Israel; He starts his article with the biblical phrase: “O mortal, set your face toward Teman, and proclaim to Darom, and prophesy against the brushland of the Negev.” [19] He adds that the best scientific, educational and pioneering forces should be directed to the Negev (Kam, 2012).

In the article he stresses that the command shall be to move “Southward”; “to divert the land’s water and rainfall southward, to send the pioneering youth and the new immigrants southward, to allocate development budget southward […] to place a number of research and science institutes that deal with the knowledge of the land […] southward […] to be able to fertilize and bloom the lands of the South.” (Kam, 2012)

The political-demographic conditions in this dryland region, combined with its place in the mythical homeland, pose perceived or concrete challenges to central government sovereignty (Orenstein et al., 2011). Thus, Ben-Gurion’s dream of the Negev becomes a national Jewish dream, one that requires a particular form of strategic planning and management to be achieved. This dream was promoted as a national goal; See, for example, the poster of JNF in Figure 7 promoting the idea of “blooming” the Negev and water diversion, with an image of a pipeline and desert landscape becoming green.

[19] Darom, Tema, and Negev mean South.

Figure 7: JNF poster: "The vision of the Negev will be established: Redemption and water to the barren wasteland". 1950s.
Source: sharonambar.com

By 1961 there were 73 Jewish settlements in the Negev, and a network of Jewish development towns and collective agriculture settlements were established in the northern Negev (Orenstein and Hamburg, 2009). By 1970, the regional development plans for the Negev focused on industrial development and encouraged bringing population to the region through the establishment of high-tech industry, army relocation, education, and tourism (Orenstein and Hamburg, 2009). Within the first decade of the establishment of the state of Israel the Bedouin community shifted from being 98% of the Negev population in 1948, to only 21% in 1961 (see Figure 8).

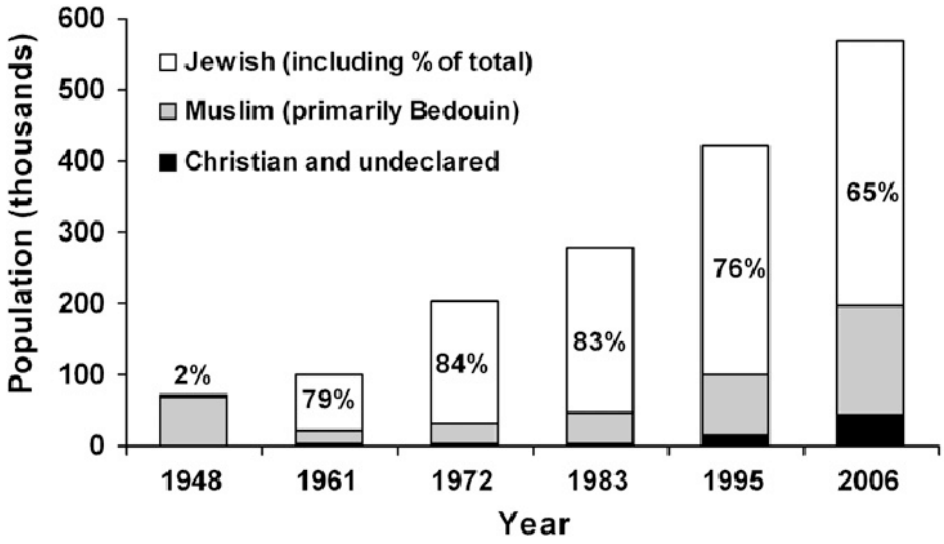


Figure 8: Population of the Negev (1948-2006).
Source: (Orenstein. et al., 2011)

2.2.2 Agriculture and Rural Development

Agricultural development was encouraged during the early Jewish immigration to Palestine. Before the establishment of the state of Israel, agriculture aligned with the Zionist ideology of rebuilding a Jewish identity that is tied to working the soil. Furthermore, agricultural development policies aligned with the defense strategy of land control (Evans, 2006). After Israeli independence, agriculture was seen as the primary means to providing employment for the large immigration wave (one million within three years) seeking food security and establishing control over land to prevent a return to the 1947 UN partition lines[20] (Feitelson, 2013).

The Zionist movement, and later on the dominant labor party in the Israeli government have remained strongly committed to a rural ideal and promoted it as a pillar of national pride (See the posters in Figure 9 and Figure 10)

[20] Israel has declared its borders in 1948 on a larger area compared to what the UN partition plan suggested. As shown in the two maps on 1947 and 1948 in Figure 1.

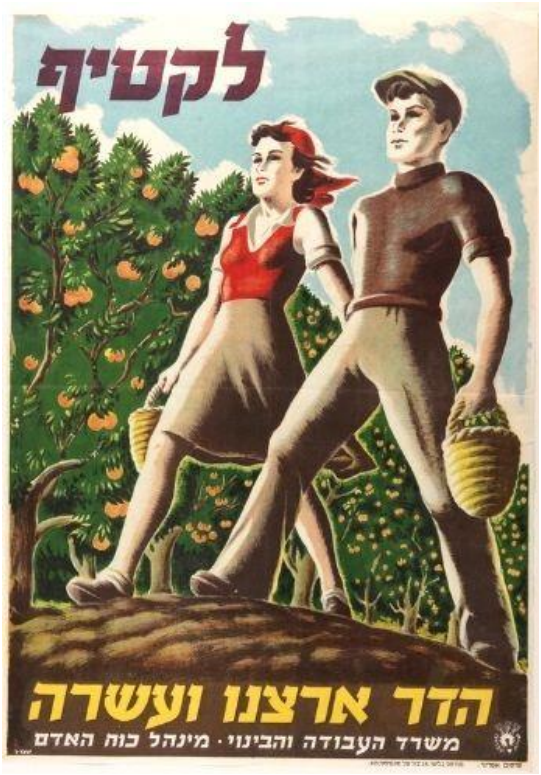


Figure 9: "The Glory and Richness of Our Country" - Poster by the Minister Office of Labor and Construction. 1950.
Source: The National Library of Israel

Figure 10: JNF Poster. 1939.
Source: JNF

The Defense Service Law (see p.#) established the Culture and Welfare Department of the Israeli Defense Forces (IDF) that provided agricultural planning as part of military training. The main goal of this training was to direct demobilized soldiers, at the end of the war, into frontier settlements. Between 1948 and 1949, 39 agricultural settlements were established by the Palmach, an elite fighting force of the underground army of the Yishuv, that later became a division within the IDF. By 1952, demobilized soldiers founded another 14 agricultural settlements (Evans, 2006, P.582).

Both the national building motive that promoted dispersal policy, and the Zionist rural development portrayal led to the establishment of several hundred cooperative and communal rural settlements, distributed as widely as possible within Israel (Katz and Tal, 2013). Only between 1947 and 1956, 360 new rural communities were already established (Kellerman, 1993, P.68). Bound to the geopolitical motive, the agricultural land was distributed across the country. Border regions were a desired destination, see for example the large agricultural parcels covering the border's area with Gaza strip (see Figure 11) in comparison with Gaza strip's spatial pattern. Another example is the buffer zone agricultural zone in the Jordan Valley between the West Bank and Jordan as part of Allon Plan[21][22] (see Figure 12).

This strategy for distributing the agricultural lands resulted in the fact that most of the lands that needed irrigation are in the water-scarce south, where local resources are insufficient (Feitelson, 2013).

[21] Allon Plan was drafted by the Israeli minister Yigal Allon following the 1967 six-days war, among other things it suggested a partition of the West Bank between Israel and Jordan and an annexation of the Jordan Valley.
[22] See also, the Pithat Shalom project of the early 1980s. The project promoted rural development along the northern portion of the Israel-Sinai border, in the dry south.

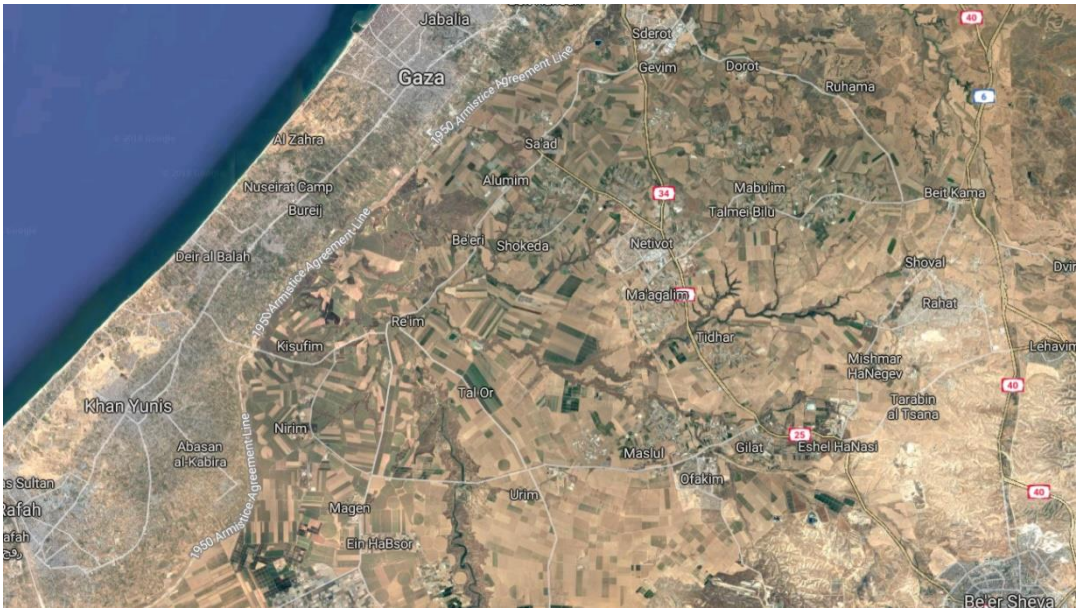


Figure 11: The agricultural land in the border region between Gaza and Israel, 2019.
Source: Google Earth

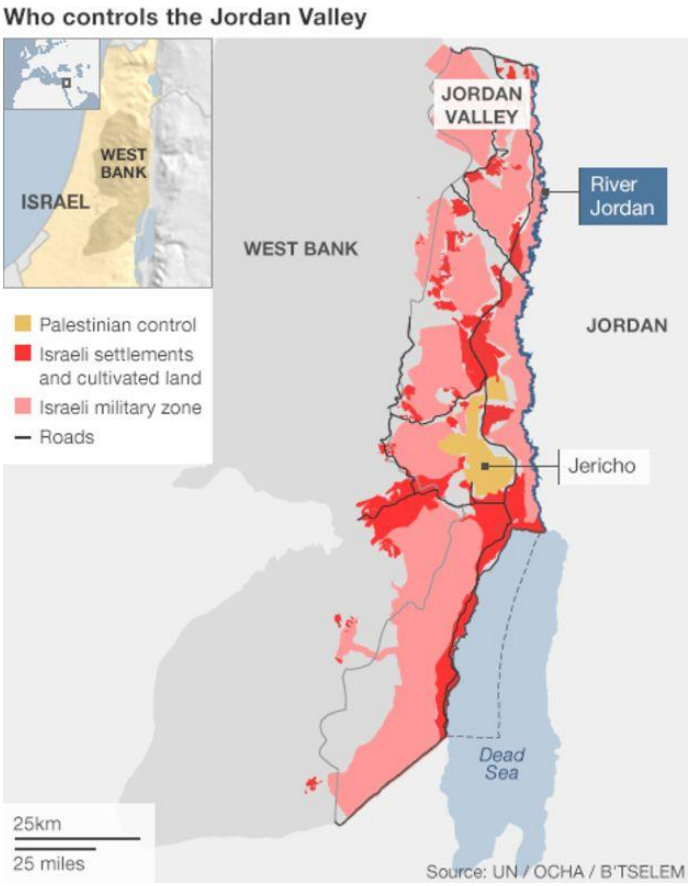


Figure 12: The Jordan Valley land distribution.
Source: UN/OCHA/B'TSELEM

Agriculture was, and continued to be, the largest sector in terms of water consumption. In Figure 13 you may see years in which the sector of agriculture consumed around 90% of the total water consumption. In **Error! Reference source not found.** we can see that it continued t o be the largest sector, although there is a dip in the chart due to technological development in agriculture and the increased uptake of the 'modern lifestyle' which has increased household consumption. In 2016, the agriculture sector consumed about 57% of the water consumed in Israel[23]). The agricultural expansion policy did not align with the nature of the water-scarce area, however, the provision of water to agriculture was achieved mainly due to the public ownership of water resources and the construction of the NWC (diverting water from the north to the south, as will be described in section 2.3) around which the water system is built (Kislev, 2013).

Within this national-planning level, those agricultural settlements got the significant attention of planners and politicians, received generous land, water, and budget allocations. (Evans, 2006)

[23] According to Israel's Water Authority's Survey

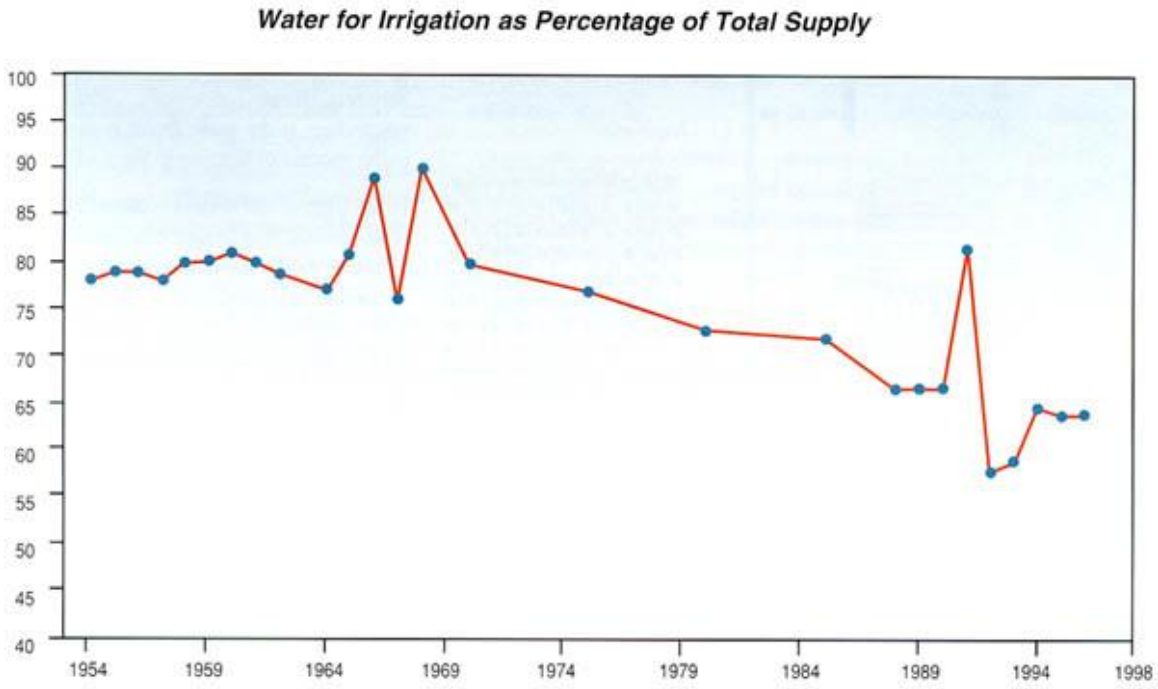


Figure 13: Water for irrigation as percentage of total supply (1954-1998).
Source: Sitton (2000)

Table 1: Water consumption is Israel in million m³.

Water consumption in Israel in million m³ (Statistical Abstract of Israel, 2006)

	1990		2000		2002		2003		2004	
	Vol.	%	Vol.	%	Vol.	%	Vol.	%	Vol.	%
Agriculture	1 216	67	1 138	59	1 021	56	1 045	56	1 129	58
Domestic purposes	482	27	662	34	688	38	698	38	712	36
Industrial uses	106	6	124	6	122	7	117	6	113	6
Total	**1 804**	**100**	**1 924**	**100**	**1 831**	**100**	**1 860**	**100**	**1 954**	**100**

Source: Food and Agriculture Organization of the United Nation

2.2.3 Dispersal Policy and the Development Towns

The dispersal planning policy shaped the spatial pattern of Israeli settlements across the country. While continuing with the rural Jewish settlement pattern, the Sharon Plan of 1950[24] proposed the dispersal of Development Towns (Orenstein and Hamburg, 2009).

[24] Sharon's plan was a national-level master plan of Israel

'Development Towns' is the term for the type of settlements that were built during the 1950s, based on the Sharon Plan, to meet the needs of the large immigration wave that doubled the population of Israel within a few years. The total population grew from being 872,700 right after the war of 1948 to reach 2,150,400 by 1960 (see Figure 31). The government directed immigrants to these areas as an integral part of a national plan for population dispersal across the national territory (Evans,2006).

26 out of the 29 development towns were built during the 1950s and 1960s, 24 of them were in the periphery; 13 in the southern periphery (see Figure 14). Those towns achieved the strategic goal of increasing the Jewish population in the periphery. As a result, by 20 years, the Jewish population in the two peripheral districts grew from 8.5% to 21.2% of the total population. In the Negev, the southern peripheral district, it grew even more dramatically from 0.9% to 11.2% of the total population (Evans,2006, p.586).

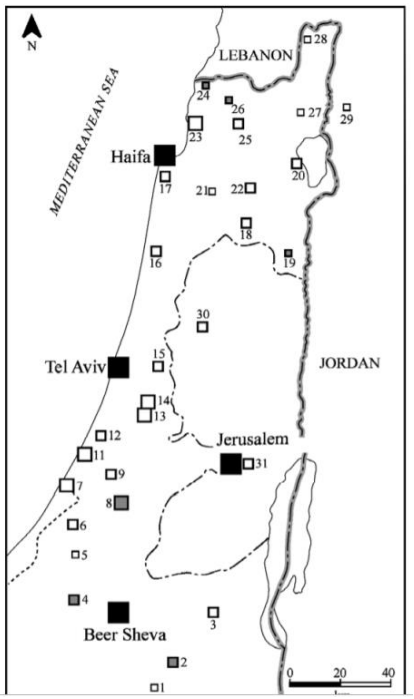


Figure 14: Israeli Development Towns (the Non-Black squares).
Source: Yiftachel and Tzfadia, 2004

The national objectives behind the dispersal policy were not accomplished by significant economic absorption opportunities. Many of the peripheral settlements were and continued to be reliant on heavy subsidies for their creation and continued viability (Orenstein and Hamburg, 2009). By the mid-1960s, around 200,000 immigrants were brought to the development towns. The vast majority of them were Mizrahi Jews (Eastern Jews- immigrants from Arab and Muslim countries) who are now living largely in rural settlements or older towns and segregated from other established Jewish groups (Yiftachel and Tzfadia, 2004)

The development towns were far from major cities and did not rely on agriculture like the rural development areas. As Evans (2006) writes, the government sometimes used heavy-handed methods to bring the immigrants to settle in development towns. Immigrants who refused to move to the designated areas faced the possible loss of housing and employment benefits (Figure 15 Shows Mitzpe Ramon, a development town in the Negev that was built for the new immigrants but was not yet developed. Figure 16 shows Arad's city in the Negev today).

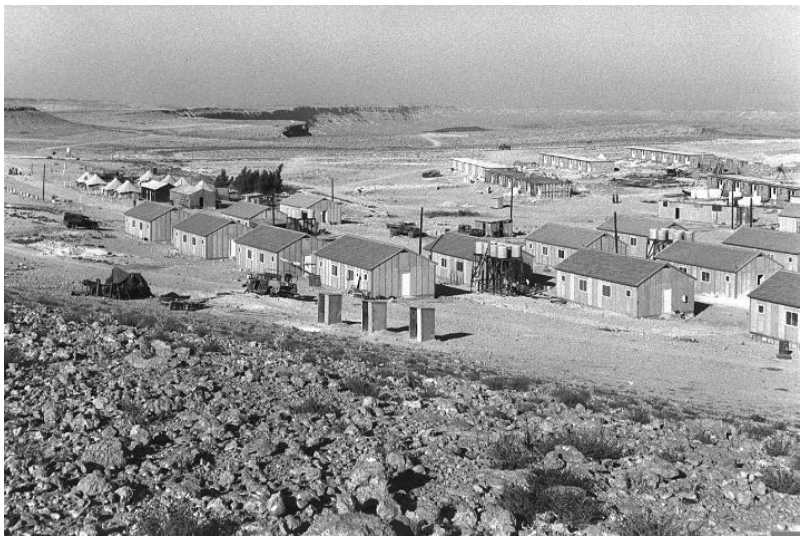


Figure 15: Mitzpe Ramon.
Source: Israel's Government Press Office

Figure 16: Arad.
Source: Neukoln -User on Wikipedia

2.2.4 Forests Planting

Another major land use practice that characterized Israeli spatial planning and transformed the natural landscape of Palestine was the planting of forests (Eid and Haller, 2018), which was a tool of "renewing Israel's battered Mediterranean landscape" (Ginsberg, 2000). By 1995, approximately 7.4% of the land surface of Israel, within its pre-1967 borders, was covered with forest. Among those 160,600 hectares of forest, 90,000 hectares (%4.2 of the total surface of the country) are planted forests (Amir and Rechtman, 2006) (see Table 2). Afforestation activities have been undertaken by the JNF (see p.#) that has planted more than 240 million trees in Israel. Between 1950 and 1966, the forested area was multiplied tenfold, from 3,326 hectares to 34,600 hectares (Ginsberg, 2000).Figure 17 shows the distribution and the coverage of JNF's forests across the country.

Table 2: Distribution of vegetation types, planted forests and areas managed by KKL (JNF).

Table 1
Distribution of vegetation types, planted forests and areas managed by the KKL

Types of area		Hectares	In percentage	
Total area of Israel		2,167,100.0	100	100
Total vegetation area managed by the KKL (NOS 22)[a]		160,600.0	7.4	100
Distribution by regions[a]	Northern region	63,700.0		40.0
	Central region	30,900.0		19.0
	Negev region	66,000.0		41.0
Total		**160,600.0**	**7.4**	**100**
Protected vegetation types[a]	existing Maqui vegetation	67,500.0		42
	existing planted forests	52,800.0		33
	existing coastal and river vegetation	8100.0		5
	proposed park-like forests	19,100.0		11.9
	proposed mixed forests	13,100.0		8.1
Total		**160,600.0**	**7.4**	**100**
Planted forest types[b]	coniferous forests	49,500.0		55
	mixed forests	11,700.0		13
	broad-leaved forests	9900.0		11
	eucalyptus groves	9900.0		10
	park-like forests of Maqui	4500.0		5
	orchards	3600.0		4
	others	1800.0		2
Total		**90,000.0**	**4.2**	**100**
Total planted forests managed by the KKL[a]		**52,800.0**	**2.4**	**58.6**

[a] KKL, 1995b.
[b] KKL, 2000.

Source: (Amir and Rechtman, 2006)

Figure 17: JNF's forests area in 2013.
Source: Society for the Protection of Nature in Israe
l

This rapid afforestation by the JNF served to realize the goals of territorial occupation and control that the Zionist movement, and later the Israeli government, had. Its main goals were protecting acquired lands, empowering the new immigration waves with a source of employment, and establishing security buffers (Amir and Rechtman, 2006, and Kliot, 1992). This ideology has driven the geographic expansion of the forests until the mid-1960, creating many strips of forests along different borders (Kliot, 1992). In addition, forests were a land use tool of control within the newly-drawn borders of Israel; to prevent Bedouins, for

example, from expanding their borders (Kliot, 1992). They also concealed “the remains of the demolished Palestinian villages” (Katorza, the responsible for signage in JNF quoted in Bronstein Aparicio, 2014), since two thirds of JNF’s sites cover demolished Palestinians villages that were demolished during the 1948 war by Zionist paramilitary organizations. Until today, forests are still planted as security buffers in different regions, see for example a martial celebration of the JNF’s project “Security Afforestation in Gaza Envelope” in 2011 in Figure 18.

Figure 18: A celebration of the JNF’s project “Security Afforestation in Gaza Envelope” in 2011.

The ecological aspects of the forests’ plantation were to prevent water and wind erosion (Kliot, 1992).

2.2.5 Drying Swamps

More than 97% of Israel's natural wetlands were filled to free up land for agriculture and settlements (Katz and Tal, 2013). Zionist land agencies, before and after the establishment of the Israeli government, worked on "swamp draining" that left the country with only 850 hectares of natural reserves out of 28,000 hectares that existed in the beginning of the 20th century (Gvirtzman, 2015). Planting forests, with Eucalyptus trees that were imported from Australia, was the main instrument for draining the wetlands.

Among those projects, the draining of the Hula Valley's lake and marsh, north of the Sea of Galilee, was a powerfully symbolic national enterprise, celebrated with patriotic fervor. It freed around 6,000 hectares for agriculture and settlements in the 1950's but created, within a few years, an environmental problem that affected underground water and the water in the Sea of Galilee (Greenberg, 1993).

2.2.6 Individual Farms

Consistent with land control and population dispersal motives, public lands were allocated to individuals to establish "individual farms" mainly in the Negev but also in the Galilee. These farms were seen as a "device to preserve the country's public land in the Negev and the Galilee" (Israeli Government Report quoted in Tzfadia, 2010), whose survival economy was based on agriculture and tourism. Figure 19 Figure 19 is an example of a farm in the desert, a large area owned by one family that mainly includes agriculture, their house, and a few more rooms for guests (upper left of the photo). Today there are approximately 100 individual farms that cover an area of 10,000 hectares (0.5% of Israel's area) (Tzfadia, 2010), and some are located in the most environmentally sensitive lands, according to the Society for the Protection of Nature in Israel (Figure 20 shows the dispersal distribution of the farms and their location in the most environmentally sensitive areas in green).

Figure** 19**: Carmey Avdat individual farm owned by Yizrael's family.
Source: Carmey Avdat Website

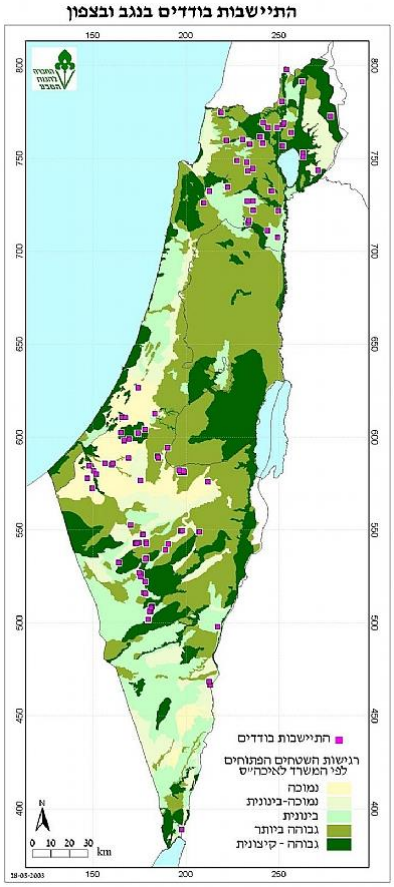


Figure** 20**: The distribution of individual farms (in purple) in relation to enviromental sensitivity of the area (With dark green indicating the higher level of sensitivity).
Source: Society for the Protection of Nature in Israel

2.3 The National Water Carrier

To ensure that the spatial planning strategies can take place and water can reach all the new settlements of the dispersed pattern, a centralized national water system was needed. The largest Israeli national water infrastructure project is the National Water Carrier (NWC), that started operating in 1964. It was the physical product of the nationalization of water resources and a centralized water management policy that emerged amidst the discourse around water scarcity. This section describes the project of the NWC and the Saline Water Carrier sub-project (in sub-section 2.3.1).

Simcha Blass's plan (see page#), Lowdermilk JVA proposal (see page#), and later, the national water plan in 1950, laid the foundation for the building of the NWC. The NWC, as seen in those plans, was supposed to convey water from the water-rich north to the dry south. However, the Litani River (in Lebanon) that was to be diverted, according to some of the plans, did not fall within Israeli borders. Instead, construction work began in 1953 to divert water directly from the upper Jordan River at Daughters of Jacob Bridge. Fire fights occurred between Israel and Syria (that shared the Jordan river with Israel before Israel occupied the Golan Heights) and complaints against Israel were filed at the United Nation, until the plan was altered (Kantor, 2001). Finally, the NWC plan diverted water from the Sea of Galilee lake in the North, through Sapir pumping station, to the northern part of the Negev in the South (see Figure 21). Using electricity, water was pumped from the lower altitude of the lake (212 meters below sea level) and carried over 130 km to the southern part of the country (Schwarz et al., 2015), reaching levels of 150m above sea level (see Figure 22). By the completion of the NWC in 1964, about 400 million cu.m of water (out of 500 million cu.m available) from the Sea of Galilee was being pumped; 80 percent of the water was allocated for agriculture, and 20 percent for drinking water (Kantor, 2001)[25]. By blocking the outlet of the lake towards

[25] This percentage has changed over the years with the changes in water consumption and with the desalination projects.

the south, Degania Dam stopped the flow of water into the Lower Jordan River toward the Dead Sea and enabled pumping water from the Sea of Galilee and this became the major fresh water source (300 mcm/year) (Schwarz et al., 2015).

Other water works in Israel, including pumping water from main aquifers and streams, were combined into the NWC to create a networked infrastructure with giant pipes, canals, tunnels, reservoirs and pumping stations, all controlled by Mekorot as one centralized system.

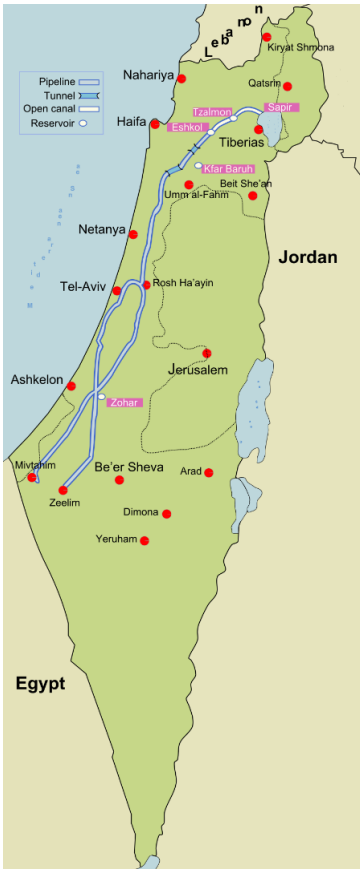


Figure 21: The National Water Carrier plan.
Source: AdamHej on Wikipedia

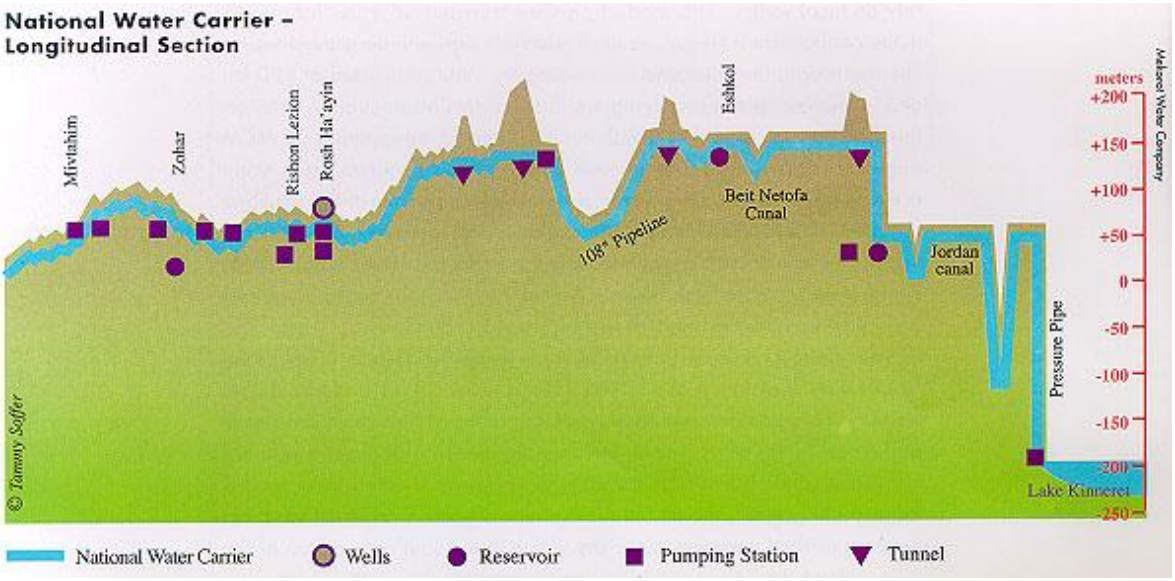


Figure 22: National Water Carrier- Longitudinal section.
Source: (Sitton,2002)

The NWC, was funded by the reparation agreement with the postwar West German government, by donations from American Jews, and from financial support from the American government (Seigel, 2015). It was nationally celebrated, through all its stages, as a demonstration of the powerful newly-established country and became one of the national symbols of Israel (see the drawing of a water pipeline crossing agricultural lands, as a symbol of the NWC, printed on the five shekel currency in Figure 23)

Figure 23: The NWC on the five-shekel currency. 1985.
Source: Seigel (2015)

2.3.1 The Saline Water Carrier (SWC)

The salinity of the Sea of Galilee is significantly higher than surface streams that flow to the lake and higher than what agricultural lands can handle (Gvirtzman, 2015). Between 1950 and 1962 its salinity reached levels of 300- 390 (mg Cl/liter) (see Figure 24). The major source of the high salinity is mainly a result of saline groundwater that emerges through off-shore and on-shore springs along the coast of the lake. Therefore, in order to be able to consume the lake's water, the water from the saline springs of the lake have to be diverted. By 1964, the SWC began to capture the saline springs in the west side of the lake and divert it around the lake to the Lower Jordan River (Rimmer,2015). This way, the salinity of the Sea of Galilee was decreased but the salinity of the Lower Jordan River increased instead. In addition, despite the diversion of saline water, the salinity of the Sea of Galilee's water that is being used for agricultural use remained relatively high for agricultural usage and caused for soil salination across the country (see sub-section 2.5.4)

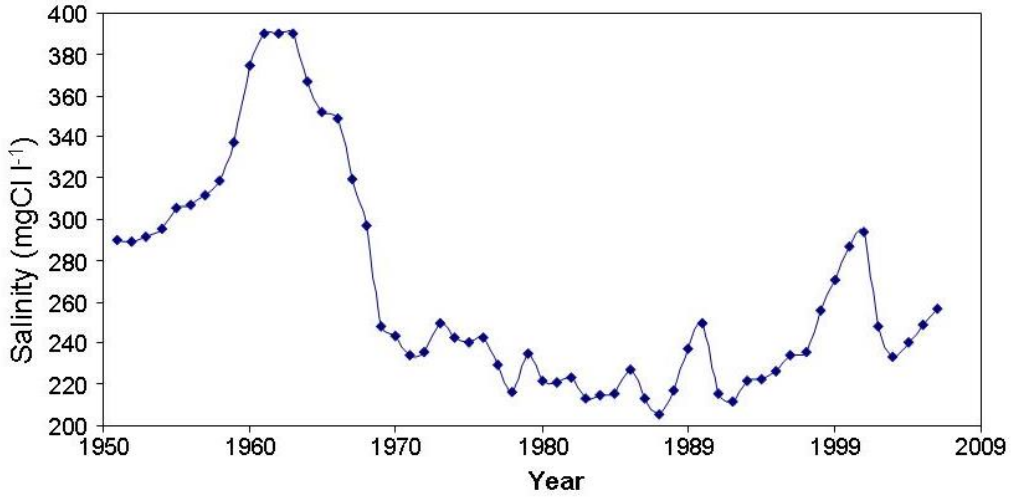


Figure 24: The salinity level of the Sea of Galilee (1950-2009).
Source: Israel Oceanographic and Limnological Research

2.4 Al Battouf Valley – A Story of Palestinians in the Galilee

Orenstein and Hamburg (2009) discussed the gap between the concurrent policies of spatial dispersion of Jews and spatial restriction for Palestinian citizens of Israel. They argue that it generated significant alienation and catalyzed opposition to land-use policies within the community. The previous chapters described the planning policies and the waterworks that characterized the Israeli nation-building. In the shade of this, Palestinians were left behind. This section will discuss the detachment of Palestinians from their natural environment as a result of the Israeli nation-building project. It starts with general background about Palestinians in Israel (sub-section 2.4.1), and then focuses on the case study of Al Battouf Valley region in the Galilee (sub-sections 2.4.2-2.4.6). This case study examines the story of Israeli control over Palestinians as an element of building the Jewish government's water projects, and the story of fertile Palestinian land that, although crossed or intersecting with the NWC, go neglected and unirrigated, eventually degrading into poor soils.

2.4.1 Palestinians in Israel

In 1948, the independence of Israel was declared after a war that ended with more than 700,000 Palestinians expelled or fled (around 50% of the population of pre-war Palestine). 512 villages were entirely demolished, while urban Palestine was almost entirely extinguished. 10 out of 11 Palestinian cities (within the geography of Israel of 1948, such as Haifa, Jaffa, Acre, etc.) lost their Palestinian population and parts of them were demolished as well (Hassan, 2018).

Today, 70 years after, the 160,000 Palestinians (Zoubi, 2005) within the Israeli borders who "survived" the Nakba of 1948 are constituting 1.7 million citizens, 20.8% of the population in Israel (According to the Israeli Central Bureau of Statistics (CBS) 2016). Most of those Palestinians live in 127 villages and towns, separate Palestinian-only communities (see Figure

25)[26]. These are local municipalities whose lands constitute only 3% of the lands inside Israel. Palestinians' lands are private lands, whereas most of the land in Israel (93% of the state land) is public property, owned by the state or by the JNF. (Nassir, 2012).

Figure 25: Map of Arab localities, 2015.
Source: Bolter21 on Wikipedia

The Palestinians' spaces grew in the shade of the massive nation building of the Israeli state that was described in previous sections. Between the years 1948 and 1968 (when most of the Jewish settlements and infrastructure were built) the Palestinians in Israel were under a military government. They were and remain the "black holes" of the Israeli planning process; Since 1948 those villages and towns grew informally on their private lands, and their population has increased by eight times without expanding their growth boundaries and without appropriate master plans. This was the main reason for the high-dense growth; small rural villages grew into densely built spaces. The Israeli government controlled these spaces

[26] The common term that is used to refer to those localities in Israel is "Arab localities"

by lands' expropriation, by building new Jewish settlements and infrastructures surrounding and narrowing the Palestinians settlements, and by total neglect of these places. The government policies, in this case, attempted to control the ethnic minority, hoping to prevent a serious challenge to the character or the territorial integrity of the state (Yiftachel, 1994). The control policies, represented by planning and non-planning, typically attempt to retard the minority's economic development, contain its territorial expression and exclude it from the state's center of power and influence (Yiftachel, 1994).

Although 40% of the Palestinian population before the Nakba was urbanized (Hassan, 2018), the vast majority of those who remained within the Israeli borders lived in villages (some of them are now called cities due to their population size). This shifted the remained Palestinian community towards an almost entirely rural society. However, the lands' expropriation that resulted in narrowing the villages' area resulted in losing agricultural lands as well as open public spaces for the sake of building houses, an initial need for the growing population. Therefore, the villages grew within their growth boundaries to become very dense spaces and lost their rural characteristics. Um Al Fahem, the second largest Palestinian town in Israel, is one example of a village that grew from 5,000 residents in 1948 into a dense town of 55,000 as can be seen in Figure 26.

Figure 26: Um Al Fahem - Second larger Palestinian town in Israel. (Taken by: Rami Jabareen)

2.4.2 The Region of Al Battouf Valley

Al Battouf Valley (Beit Netofa Valley) is a valley in the Lower Galilee region in the northern district of the country (see Figure 27) and it lies between Al-Shaghour Mountain (Yodfat) to the north and Tur'an Mountain to the south. Its lands are considered among the most fertile agricultural lands in the area. In order to cultivate this land, and to curb the flooding that occurs during the winter rains once every two years (Madar, 2008), villages were built on hillsides along the margins of the valley. Around the valley, there are the Arab villages Kafr Manda, Rumeit Heib, Rumana, Uzayr, Bu'eine Nujeidat, and Eilabun, and a Jewish Kibbutz Hanaton. On the hills, there are some Jewish settlements that overlook the valley; Hararit, Avtalyon, Beit Rimon, and Mitspe Netofa.

The valley covers an area of around 4,000 hectares of agricultural lands that do not fall under any local jurisdiction. Around 35,0000 of them are owned by Palestinians from the near villages of Kfar Manda, Arraba, Sakhnin, Rumana, Uzayr, and Eilabun, and the rest were lands of the demolished Palestinian village Saffouri that were expropriated for the Yodfat cooperative Jewish settlement after the 1948 war (Madar, 2008).

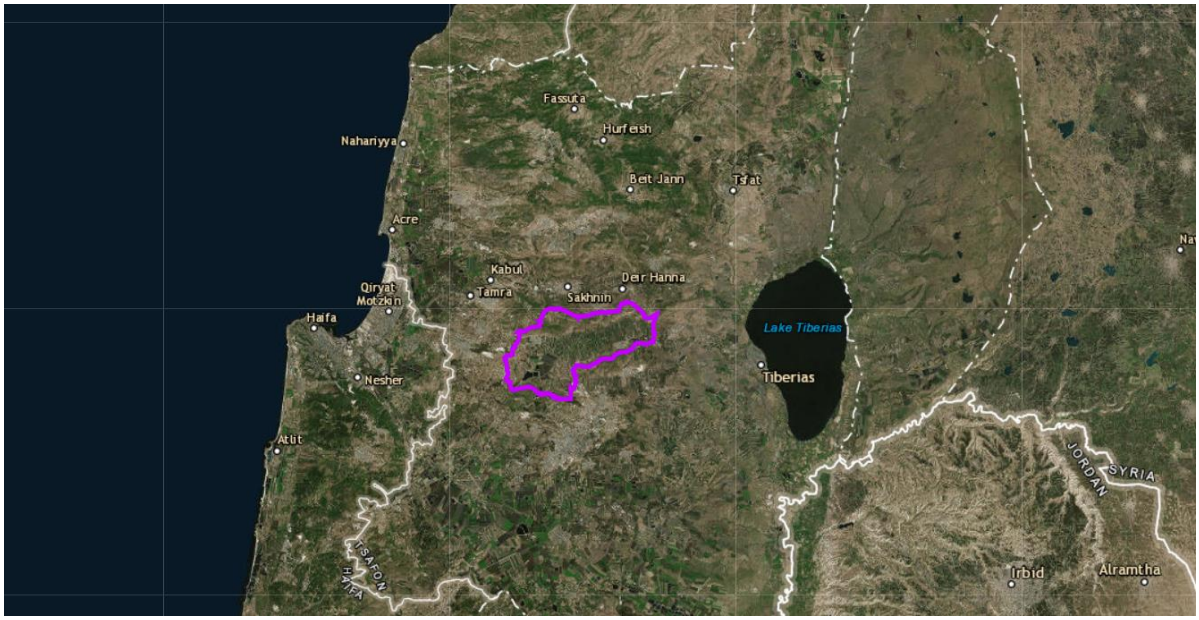


Figure 27: Al Battouf Valley boundaries.
Source: (Arad et al., 2015)

2.4.3 The National Water Carrier in Al Battouf Valley Region

The NWC cuts through Al Battouf Valley region on its route from the Sea of Galilee to the Negev. The first tunnel along its route was constructed in 1953 under the range of hills of Eilabun village and is called Ya'akov Tunnel. It is an 850-meter-long tunnel with a 3-meter-long internal diameter. The tunnel conveys the water from the open Jordan Canal to the open canal that crosses Al Battouf Valley- the Beit Netofa Canal (Kantor, 2001).

The Beit Netofa Canal (see Figure 28) is a major 17 km long open canal on the route of the NWC. To dig it, the Israeli government expropriated the privately-owned fertile agricultural lands of the valley, owned by Palestinians residents of the near villages.

Figure 28 : The open canal crosses Al Battouf Valley.
Source: Ashams.com

The canal carries the water to the southwestern side of the valley, to the Eshkol[27] reservoirs. There are two major reservoirs here; the first one is a "sedimentation pond" with a capacity of about 1.5 million cu.m of water and serves primarily a sanitary function. The second one is separated from the first one by a dam and holds 4.5 million cubes of water. Their main function is to regulate the inflow from the open canal versus the outflow into the closed pipeline depending on the overall water demand of the country.

2.4.4 Kfar Manda Story

Kfar Manda is an old village established in 1735 (Shinnawi, 2015) in the western side of Al Battouf valley. It is a significant location due to its fertile agricultural land and the spring that

[27] Named after Levi Eshkol

lies within its boundaries. In 2017, the village's population of 19,326 was predominantly Arab Muslims citizens[28]. In 2013, its socio-economic index was 2 out of 10 (with 1 being the lowest) and it was ranked 18 out of 1255 local municipalities according to its socio-economic index (with 1 being the lowest ranking)[29].

In the early 1950s, before the NWC project's layout was finalized, all of Al Battouf Valley was to become a reservoir to hold the diverted water from the Jordan River. The Sea of Galilee was not part of the NWC plan yet and water was supposed to start flowing into the NWC from the Upper Jordan River before it reaches the Sea of Galilee. According to this initial plan, Kfar Manda village was to be flooded and its lands were to be expropriated to hold the reservoir (In Figure 29 you may see the white area depicting the proposed reservoir and that Kfar Manda lies within it).

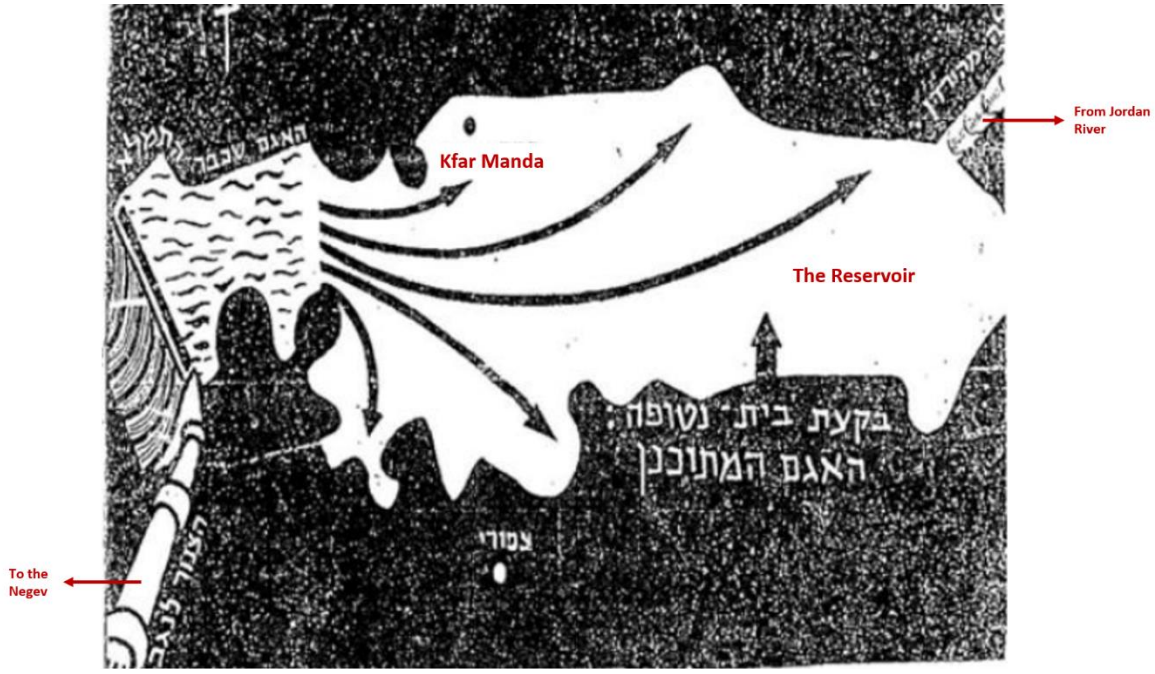


Figure 29: Kfar Manda Village, falling within the proposed reservoir
Source: (Shinnaw, 2016)

[28] CBS
[29] CBS

In December 1954, the villagers of Kfar Manda received eviction orders. Police forces, agricultural ministry officers, and technicians from Tahal arrived in the village to measure the houses that were supposed to be destroyed. The villagers protested and the police fired live ammunition at the residents, wounded dozens of them, and arrested over 100 people. This event was called 'Uri Day', after the name of Uri Tahon, an officer of Tahal that worked in the Galilee region for the NWC project and was known to the villagers of the region (Zoubi, 2005). Although the plan changed[30] and Al Battouf Valley did not become a reservoir, 'Uri Day' remains vital and is known to be the first documented clash over the implementation of the NWC between Israelis and Palestinians.

2.4.5 Eilabun Story

Eilabun is a predominantly Christian Arab village in the eastern side of Al Battouf Valley with a population of 5,588 in 2017 (CBS). On October 30th, 1948, the village witnessed a massacre in which 14 young men were killed by an Israeli military group. According to the Israeli Defense Forces' (IDF) archive, on October 13th, 1948, an order was issued to the military regional divisions urging them to "do all you can for an immediate and quick cleansing of all the occupied territories from all the hostile elements. According to orders, you should help the residents to leave the occupied territories" (Zreiq, 2007). Residents of Eilabun village were hiding in the church when in the early morning the military group forced them out to the main square of the village, randomly picked a number of their young men, and killed them. The rest of the residents were forced to walk 150 km to the Palestinian refugee camp in Lebanon where they stayed. Two weeks after, another massacre happened with Al

[30] Due to the soil type of Al Battouf Valley that enables water to percolate through (Zoubi, 2005), which means the loss of the quantity of surface water to groundwater. Also, the international agreements that prevented Israelis from diverting water directly from the Upper Jordan River led to the pumping from the Sea of Galilee lake which is considered a reservoir by itself.

Mawassi tribe, a Bedouin tribe who lived near Eilabun in Al Battouf Valley. The IDF executed 14 men in the valley and expelled their families as well.

Later on, after the massacre was revealed by those who survived, letters were sent to the UN, Eilabun village got a special permit to come back to their village. People started another journey walking back from Lebanon to Eilabun after few months.

A few years after the event, Eilabun's agricultural lands were expropriated for establishing Tsalmon Reservoir (part of the NWC); "Those lands were planted with fruit trees, apples, and peaches. Uri [31], who was a good friend of many people in the village, told us that Mekorot wants to buy our lands and we should all go there. Then, Mekorot suggested buying the land and for those who did not want to sell, they said that it is not possible and that they will put the money in the bank for them. So, this reservoir was built on our lands" (Mattar interview, 2019). Many hectares of lands were taken for the project, and the tunnel was drilled underneath the village's hills. A group of men from Eilabun (and other villages) even became laborers for the project, "We lost everything, we came back to find nothing here, I even didn't ask I just wanted to get my daily living. We knew that they are taking water to the Negev, that was all we knew." (Mattar interview, 2019).

2.4.6 The Agricultural Lands and the Canal

Most of the agricultural lands within Al Battouf Valley, around 2,800 hectares (Jarbouni, 2018), are owned by the residents of Sakhnin and Arraba, two Arab villages[32]. Beit Netofa Canal, the open canal that crosses the valley from east to west cuts through their land at the beginning of the 1960s and resulting in the second documented clash between Palestinians from the military-governed villages and the Israeli government around the NWC project. In

[31] Which most probably the same Uri from Tahal.
[32] Today, Sakhnin and Arraba are among the largest Arab cities of the Galilee with Christian and Muslim residents. Sakhni populated 30,548 in 2017 and Arraba populated 24,972 (CBS).

1961, the Ministry of Finances issued two announcements (February 23rd and March 20th, 1961) declaring: "The Israeli government will expropriate lands from Al Battouf Valley of 93-meter width and 17 km length, of which a 12 km portion falls within lands owned by Arab peasants from Sakhnin and Arraba" (Zoubi, 2005). After a series of protests and objections by people from the villages, violent clashes started in June 1962 when Mekorot's bulldozers started digging through land. The local people prevented the continuation of the work by blocking the bulldozers ways with their bodies, until Mekorot got a court approval in August and continued the work secured by police forces (Zoubi, 2005). Dozens of people were detained during those events and some landowners were temporary exiled outside the region until Mekorot finished the work (Jarbouni Interview, 2019).

In 1964, the NWC was officially opened and started operating. Jewish settlements all across the country received water and their agricultural land received irrigation, but not the agricultural lands of Al Battouf Valley. Even today, the agricultural lands of the valley that are owned by Palestinians do not receive water for irrigation, but the lands owned by Jewish people, or the seized forests surrounding the valleys receive subsidized water for irrigation.

The ownership of the agricultural lands of the valley remained within Palestinian families and, with time, land became better subdivided such that the valley is now owned by 5,000 different owners and divided into small parcels of 0.5-2 hectares each (Kivun, 2008).

Al Battouf Valley is among the last surviving agricultural landscape of small parcels in Israel, that are cultivated with diverse crops creating a colorful agricultural landscape. Today, despite the area's fertile soil, the valley's agricultural lands are not irrigated and do not have a stormwater drainage system. The farmers still rely on rainfed agriculture that cannot provide sufficient water to grow crops that could compete with the intensively irrigated and subsidized large-scale agriculture in the Jewish settlements. The absence of a drainage system, which requires governmental approval and cannot be constructed individually,

leaves around two-thirds of the valley's lands flooded every other year (Jarbouni interview, 2019). In addition, the shift to using chemical fertilizers and the absence of a drainage system is causing soil salinization and threatening the quality of the soil (Tarabeih interview, 2019).

For decades, farmers have been fighting to get irrigation pipelines and to construct a drainage system but their demands have been ignored and denied by the different governmental ministries. Today the farmers are faced with the ecological and environmental preservation argument which has become the government's defense for not irrigating the lands and not building a drainage system. The main concerns the government is raising are the unique and rich environmental qualities of the flooded areas, along with the richness of species in the traditional agriculture lands that have not transitioned to the agricultural monocultures of the irrigated Jewish settlements.

During the era of expanding the intensively irrigated agricultural lands, Palestinian agricultural lands were left behind and became economically non-profitable. Today, with raised environmental awareness and concern, those non-profitable lands are a target for preservation. The Ministry of Agriculture and Rural Development, Ministry of Environmental Protection, and The Fund for the Protection of Open Spaces[33] are proposing a plan to preserve the traditional agricultural style and to promote tourism in the valley. Residents of the nearby Arab villages and towns are no longer benefiting from their agriculture lands. In Sakhnin and Arraba, no more than 10% of the residents work in agriculture, compared to 90% in the past (Kivun, 2008, p.8). This transition of lifestyle has created many social transitions and conflicts as well; farmers have begun to sell their lands or turn them into residential parcels, losing their cultural connectivity to their land and their natural environment, in exchange for the dense and fast growing cemented villages.

[33] An agency under Israel Land Authority

The national government control over nature has limited the local people's agency over their lands and the nature that they live with. The practice and culture of agriculture has disappeared from people's daily life; even their livestock have been prohibited from what used to be common open lands but were seized and are now, JNF's lands. This alienation from nature is not a unique story to Al Battouf Valley, but true to most of the Palestinian rural villages. In 2008, only %12 of the agricultural lands owned by Palestinians in Israel were irrigated. In 2002, only %2.2 of the freshwater allocated for agriculture were for lands owned by Palestinians. (Kivun, 2008)

Ironically, the beautiful landscape of the colorful parcels of Al Battouf (see Figure 30) are overlooked by the Jewish settlements on the surrounding mountains, creating a new source of tourist entertainment and profit.

Figure 30: Lowdermilk lookout point. JNF
Source: www.eyarok.org.il

2.5 The Drought and Nature Transformation

The technologically advanced water projects in Israel and the seemingly successful water policies, together with the national spatial planning strategies and rapid demographic growth (see Figure 31), depleted the available natural water resources, almost entirely, by the beginning of the 1970s (Zaslavsky, 1999).

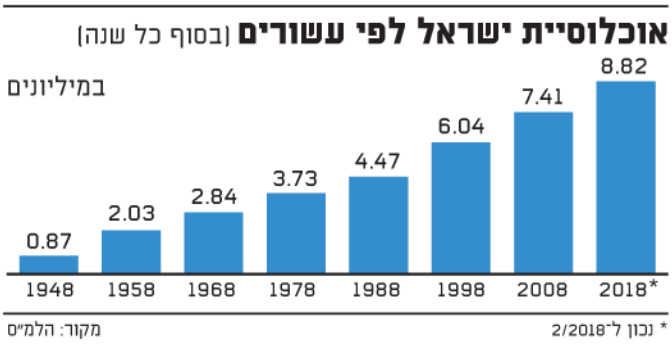


Figure 31: Population in Israel (in millions)(1948-2018)
Source: CBS, 2018

Essentially, the scarcity discourse that was applied to establish the national institutions and the centralized system turned into an actual drought following the early overexploitation of surface and groundwater resources.

The increased stress on the water system beginning from the mid-1960s[34] could not be hidden, but the many official reports'[35] and experts' warnings did not have any impact on the policies. Researchers partially attributed that to the significance control of the agricultural sector, the highest consumer of water, over water policymakers (Feitelson, 2013).

The water management policies in Israel have been criticized for being outdated, inefficient, and environmentally detrimental (Feitelson, 2013). Dery and Salomon, quoted in Feitelson

[34] The beginning of operating the NWC
[35] Such as the State Comptroller report in 1966 forewarning the excessive groundwater abstraction (Feitelson, 2013)

(2013) argued that it became increasingly apparent that overdrawing of water resources in the mid-1980s was a governing policy and not an aberration. Environmental concerns were overlooked for decades (see Figure 32) and by prioritizing demographic and national security concerns the damage could be irreversible.

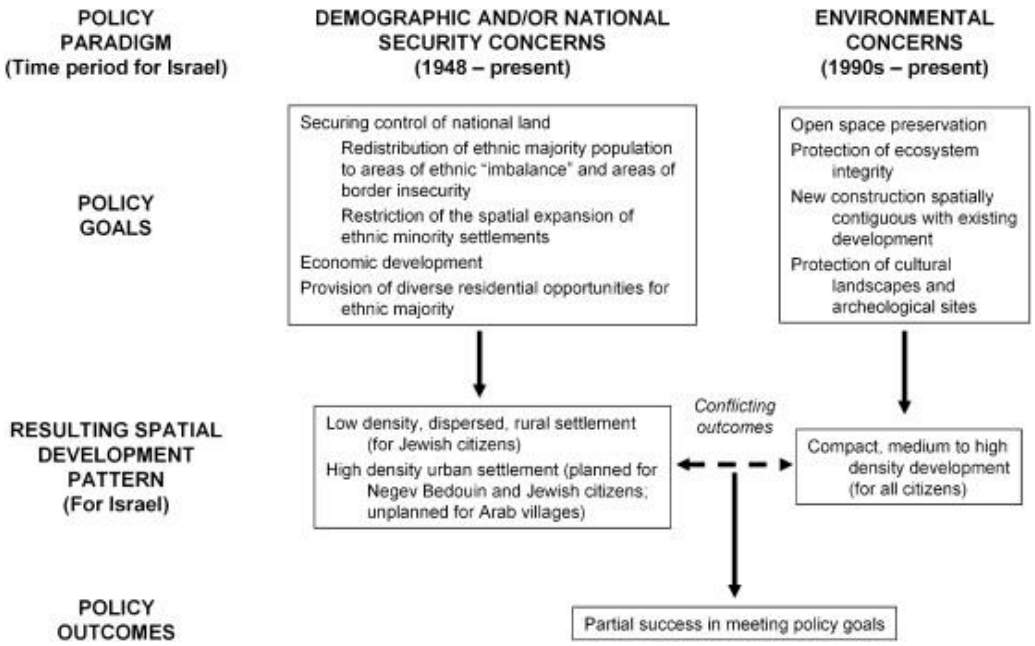


Figure 32: Policy Paradigm in Israel.
Source: Orenstein and Hamburg, 2009

In this section, I will introduce the environmental effects that have happened over the decades of water overexploitation. I will show how water policy, serving the national project, transformed the natural environment and dramatically changed the landscape.

2.5.1 The Sea of Galilee Lake

The overexploitation of surface and underground water had a very visible impact on the Sea of Galilee's water level and on its quality. The lake's levels were almost continuously dropping since the beginning of operating the NWC, reaching a lowest peak level of -214 meters in 2001 (see Figure 33). During the mid-1980s the water's level dropped below the

lower "red line"[36] prescribed for the Sea of Galilee and the Mountain Aquifer. However, the water Commissioner lowered the "red line" to the level of the intake for the NWC (Feitelson, 2013).

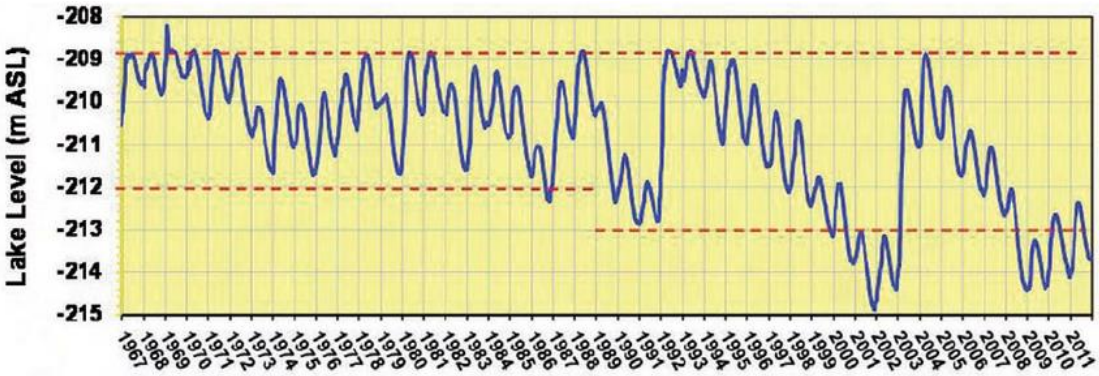


Figure 33: Sea of Galilee water levels from 1967 to 2011
"as measured by the Hydrological Service of Israel. The vast changes in the water level over the last 20 years are noted, including the minimum water level of –214.87 at December, 2001. The dashed red lines mark the upper and lower "red lines" as decided by the Water Authority."
Source:(Tibor et al., 2012)

Today, the low water levels revealed a large island near the lake's southern shore (see Figure 34)

Figure 34: Island in The Sea of Galilee, 2018.
Source: Yuval Gassar, Haaretz

[36] The concept of the "red line" was established in 1960 and it functions as a warning tool. It indicates the lowest water level administratively allowed to operate in the lake. By reaching the lower red line the situation requires re-examination of the water pumping management system in Israel as a whole, and in the Sea of Galilee's basin in particular (Feitelson et al., 2005). The "black line" indicates a level of irreversible ecological damage

Despite the fact that climate change has contributed to rising temperatures and rainfall levels in the area, studies show that this is not the primary reason for the significant decrease in the lake's water levels. There are no decreasing trends in the inflow from the headwaters of the Upper Jordan River (in Lebanon) and the temperature changes in the basin are too small to explain the magnitude of the streamflow decreases (Wine et al., 2019). What Wine's et al (2009) study reveals is that the decrease in discharge of the Upper Jordan River correlated with a period of expanding irrigated agriculture, doubling groundwater pumping rates within the basin, and increasing of the area of standing and impounded waters.

2.5.2 The Dead Sea

The Dead Sea is a salt-lake bordered by Jordan to the East and Israel and the West Bank to the West (see Figure 6). It is the earth's lowest elevation on land with a unique ecological environment. The Dead Sea's main water source is the Lower Jordan River that flows from the Sea of Galilee southwards. This flow was blocked by the Degania Dam in the southern outlet of the Sea of Galilee, and together with the over-pumping of water, the streamflow was stopped in the lower portion of the Jordan River – Israel's only river. The flow declined by over 95% relative to the natural flow (Katz and Tal, 2013).

As a result, the Dead Sea is shrinking at an alarming rate, about 3.3 feet per year, according to the environmentalist group EcoPeace Middle East (Wehelie, 2016). The surface area of the Sea has decreased by about a third to its current 630 km^2, according to the Geological Survey of Israel (see the shrinking of the sea's area within a few decades, in Figure 35). After water stopped reaching the southern portion of the Sea, it became entirely dry and was turned into an artificial lake (see Figure 36).

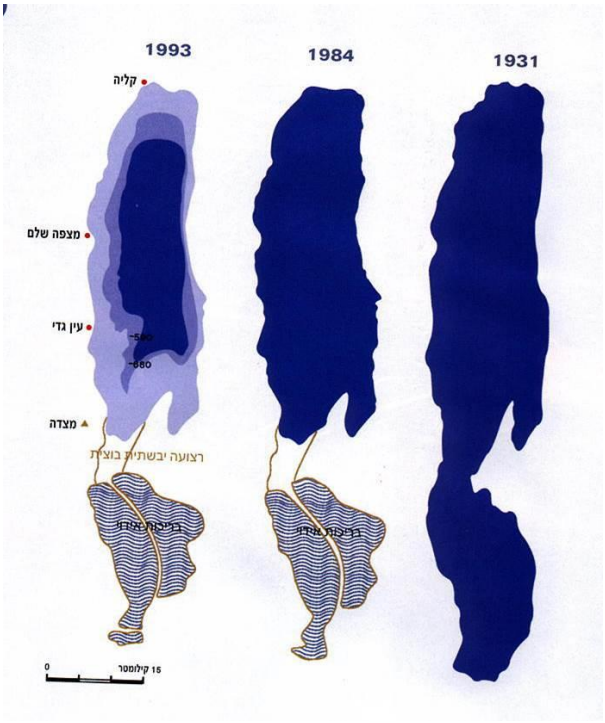


Figure 35: The Dead Sea 1931-1993.
Source: EcoPeace Middle East

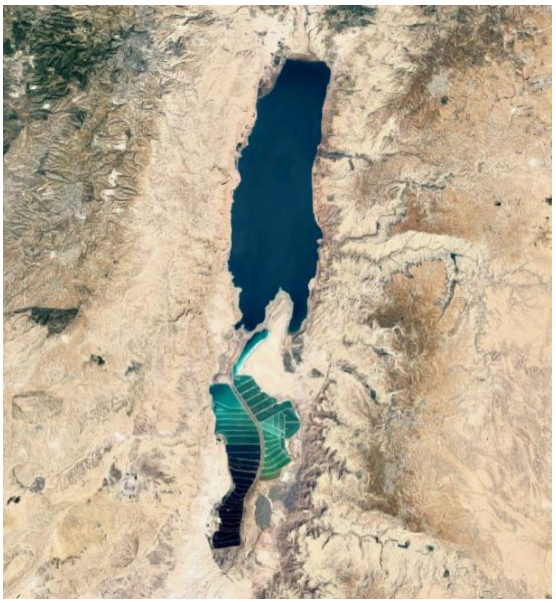


Figure 36: The Dead Sea today.
Source: Google Earth

2.5.3 Aquifers and Streams

During the first years of the country (1950–1965), the emphasis was on intensifying pumping by drilling numerous wells in all aquifers (Schwarz et al., 2015). Those wells were later connected to the NWC network and managed together with the pumping from the Sea of Galilee. This over pumping led to a drastic decline in aquifer levels. It resulted not just in the drought of the aquifers, but also in a saltwater intrusion after water had reached very low levels (Gvirtzman, 2015). Many pumping stations have closed due to these reasons.

In addition, as a result of the aquifer low levels, several springs supplying the streams ceased to flow (Katz and Tal, 2013).

Despite the streamflow's ecological value, it was seen as "wasted water" during the first few decades of the Israeli country. They were largely denuded, polluted, and rerouted to reduce flood risks (Katz and Tal, 2013). This was manifested in the Water Law of 1959 that did not, until 2004, include "nature" under the list of uses to which water can be allocated (Feitelson, 2013)[37]. This reflected the values' priorities that have driven the water policymakers in Israel that disregarded the ecological values and turned out to be detrimental to the environment (Katz and Tal, 2013).

According to different studies cited in (Katz and Tal, 2013), the water flow in two-thirds of all springs monitored were severely reduced and/or actively witnessing declines. Some streams with previously constant flow became intermittent, whilst some of the intermittent streams ceased to flow at all. As mentioned earlier, the streamflow in the lower portion of the Jordan River declined by over 95% relative to natural flows. The Yarkon stream, that runs through Tel Aviv, the largest metropolitan area, is less than %2 of its historic flow. Out of all

[37] Those uses included (1) household needs; (2) agriculture; (3) industry; (4) industry, commerce; and (5) public services (water Law 1959)

of Israel's streams, only the headwaters of the Jordan River remained with significant levels of natural flow and a functioning natural ecosystem (Katz and Tal, 2013).

In addition to the drought of the streams, the neglect of their value led to polluting them with sewage, industrial waste, trash, etc. Until today, despite the sewage treatment system, some streams still house decades' worth of remains containing heavy metals and organic chemical compounds (Katz and Tal, 2013).

After decades of overexploitation and ignorant water policy that focused on economic development, the natural water sources, both surface and underground, have been severely damaged.

2.5.4 Soil Salinization

The diversion of water from the Sea of Galilee to the south has increased the salt level in the groundwater of the central regions of the country. For 40 years, the NWC carried the saline water of the lake (around 250 (mg Cl/liter) even with the SWC) southward to the Coastal aquifer, raising its salinization level from 100 to 200 (mg Cl/liter) (Gvirtzman, 2015). The high salinity of water used for irrigation has also become a concern that is threatening the agricultural production (Feitelson, 2013). The soil salinization was a result of the diversion of saline water from the North and the use of treated sewage water in irrigated agriculture (discussed in chapter 3.2).

2.5.5 The Natural Reserves

Drainage of wetlands, expansion of agriculture, forests, urban and rural settlements, have decreased natural reserves from 28,000 hectares to only 850 (Gvirtzman, 2015). Moreover, the drought crisis has severely affected existing natural reserves. The environmental damage of erasing the ecological systems is sometimes irreversible. The Hula Lake drainage project

is one example of transferring the whole region for building peripheral settlements and expanding agriculture. In Hula Valley, the “agricultural development of the reclaimed land was unsuccessful, and soils were affected by continuous underground fires. Weathered peat soils, without a vegetation cover, were eroded by wind. Another ecological effect was the release of nutrients by the decomposing peat, with the nutrients carried by the Jordan river floods into the eutrophic Lake Kinneret. To prevent the natural subsidence a small shallow lake, 110 ha in area, and a network of canals were created in the 1990” (Inbar, 2002).

3. Manufactured Water

The Sea of Galilee and the aquifers were the main two water resources used over the first four decades of the Israeli country. The overexploitation of those two natural water resources created the need for new technologies to overcome the drought and water scarcity (Gvirtzman, 2015). The need brought the policy makers first to start a large-scale wastewater treatment project in the 1990s and large-scale seawater plan in the early 2000s.

In 2015, 62% of the water used was manufactured water, 11% from brackish water, 21% from sewage, and 27% from seawater (see Figure 37).

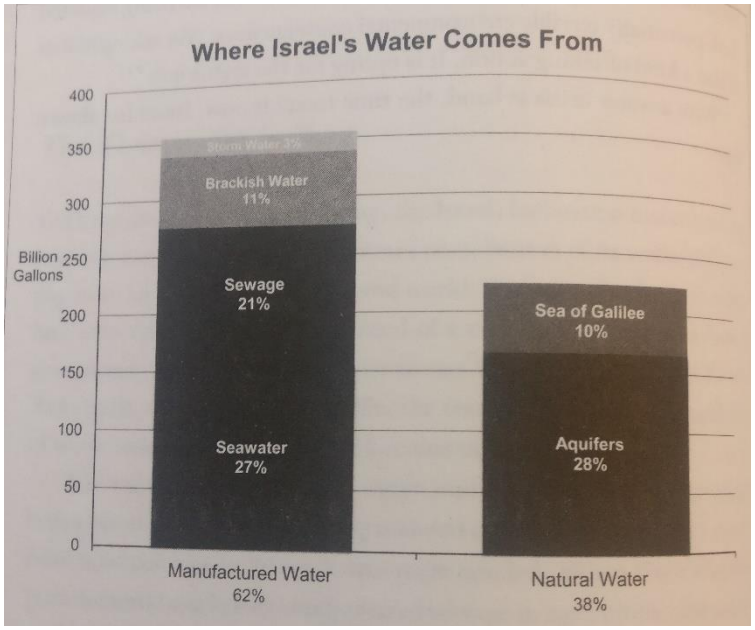


Figure 37: Where Israel's water comes from? - Water Authority data 2015.
Source: Seigel, 2015 p252

This chapter discuss the next stage of the Israeli water projects – the manufactured water that continued the transformation of nature through technology in an attempt to solve the earlier damage.

3.1 Wastewater Treatment

According to the Israeli Water Authority, today, around 75% of Israel's wastewater is treated and reused again, mostly for irrigation. 135 factories are treating wastewater to provide 31% of the water used for irrigation and 18% of the water in general usage.

Discussions around treating wastewater started in the early days of the establishment of Israel, however, after the 1980s it became "clear that without recycled water, agriculture, as it was then practiced, would have to come to an end in Israel" (Yossi Schreiber, a senior executive at the JNF, quoted in Seigel, (2015)).

As discussed in the previous chapter (See section 2.2.2), agriculture was a vital instrument for the establishment of the national state, and it has strong advocates within the Israeli government. The Agriculture's Water Planning Department was allocating subsidized freshwater for farmers since the first day of the state (Seigel, 2015). Getting rid of those subsidies was a political issue rather than a scientific question that targets the economic benefits and the natural capacity of water resources. The treated wastewater, hence, was a good solution to save the field of agriculture. Farmers were promised extra allocation of treated water for every unused unit of their freshwater allocation, of which the treated water was nitrogen-rich benefitting their agriculture practice (Seigel, 2015). This effectively shifted the main source of water for irrigation, such that by the early 2000s century, most of the irrigation in central and southern Israel was supplied by treated wastewater (Feitelson, 2013).

3.1.1 The Salt Danger

As discussed in section 2.5.4, the diversion of saline water from the Sea of Galilee has resulted in soil salinization in the center and the South. The saline water that reaches the

houses leave them with higher salt level given the household usage, however, the sewage treatment plants do not remove the salt from water. Using the treated wastewater for irrigation has resulted in raising the salt level in the soil.

According to Banin and Fish's research on the Jazeel Valley, secondary salinization of intensively irrigated lands makes alarming suggestions of the desertification process which was experienced in many irrigated regions. Due to the intensive irrigation, the "recirculated salt — salt picked up by impounded surface water and applied to fields — increased significantly and in the late 1980s amounted to more than 9,000 tons Cl per year. The source of recirculated salts was the accumulated salts in soils and in the shallow aquifer in the valley, which were leached by floodwater or drained or infiltrated into reservoirs, grossly and adversely affecting water quality." (Banin and Fish, 1995).

According to Dr. Avner Zilver in his interview with NRG newspaper (Kraus, 2014), the wastewater usage for irrigation ruined the agricultural lands. He claims that the decades of soil salinization must come to an end, otherwise "we have to migrate."

3.1.2 Health Concerns

According to studies quoted by Tal (2016), "sewage contains plant damaging substances such as Na, Cl, bicarbonate and heavy metals as well as human pathogenic bacteria which pose ongoing public health and agronomic challenges." In addition, "Initial concerns associated with recycling sewage involved micro-organisms. Beyond affecting farmers through direct contact, pathogens can leave consumers exposed to produce with a range of harmful bacteria." (Tal, 2016).

Moreover, pharmaceutical products survive the treatment process as well. Concerns are raised regarding the role of those products after they leave human bodies. (Seigel, 2015)

3.2 Desalination

"The irrigation of the desert with purified seawater will appeal a dream to many, but less than any other country should Israel be afraid of dreams capable of transforming the natural order… all that has been accomplished in this country is the result of dreams that have come true by virtue of vision, science, and pioneering capacity." David Ben-Gurion, 1956 (Seigel, 2015). Since the early days of the Israeli state, desalination was considered to achieve the Zionist goal of building a secure and self-sufficient economy. However, at that time, a large-scale desalination plan was expensive and considered a theoretical solution.

The increase in freshwater consumption in irrigation in the early 1980s, along with the drought of the late 1980s water levels dropped the "red lines" for the Sea of Galilee and the Mountain Aquifer. The debate over water policy in Israel was limited to a small technocratic elite for decades. However, overexploitation of freshwater resources brought the debate into the public sphere (Feitelson, 2013). The desalination funds, however, were blocked by the treasury because of the low water tariffs for agriculture and the fact that the agricultural lobby in the Knesset blocked all attempts to raise them. After the severe drought of 1999-2000, a large-scale desalination plan was raised again as a realistic option (Feitelson, 2013), and a major shift in thinking took place in 2005 with a large investment in constructing seawater desalination plants (Schwarz et al., 2015), and the opening of Ashkelon plant. Today, Israel has 5 seawater desalination plants along the Mediterranean coast, that provided, by 2015, 27% of the water consumption (see figure 38.). In addition, dozens of Brackish water desalination plants (see Figure 38), provided by 2015 11% of the water consumption. Together, they provided 80% of the total industrial and household consumption of water in 2015, according to the Israeli Water Authority.

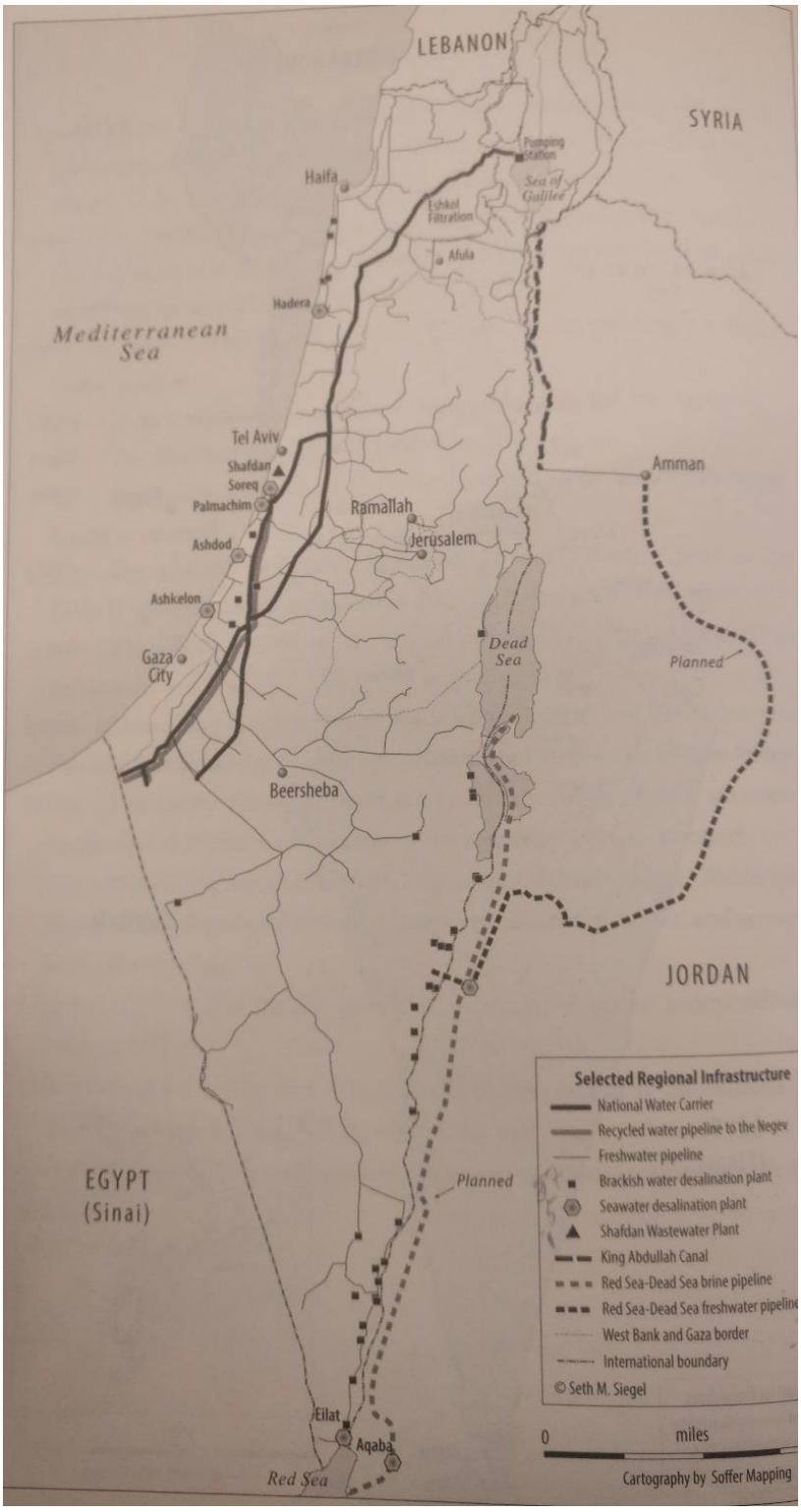


Figure 38: Water infrastructure.
Source: Seigel, 2015

Conclusion

The Israeli approach to water resources management has shifted a number of times since the inception of the nation-state. It started with believing in a water-rich “Palestine, land of promise” but soon adopted the water scarcity approach to create a state monopoly over water resources management. First, the Israeli state’s technological projects and its spatial planning overexploited natural resources creating historic drought and soil salination. The resulting problems of severe fresh water shortages are being solved again with technology: wastewater treatment and seawater desalination systems now provide water for household, agricultural, and industrial consumption source. 63% of the water used in Israel today is manufactured.

To conclude, environmental damage and inequality are the outcomes of Israeli water projects since its early days. Water resource management systems benefited the privileged and increased the vulnerability of the underprivileged who were reliant on nature but cannot afford to be so anymore.

Nature transformation and the state’s monopoly over nature has changed the face of the region that once provided the natural environment for Palestinian livelihoods that were rooted in agriculture. It detached Palestinians from the environment that structured their daily life, identity, social order and development opportunities. The local knowledge of land, water and other natural resources is no longer relevant on territories under the employment of Israeli technological knowledge that have transformed the natural order. The philosopher of power, Michel Foucault, noted that power and knowledge are not independent entities but are inextricably related - knowledge is always an exercise of power and power always a function of knowledge. Foucault argues that there is a relationship between knowledge production and social power. In the context of the modern state, Foucault refers to this relationship as "Governmentality", the logic of government and governance in the modern

state. He analyzes the operations of knowledge production as a technology of governance that is based on arrays of data. These governance technologies are determined by existing power structures, that govern intervention options and the representation of realitySuch mechanisms allow the planner and the planning system (as a part of the state) to determine which local knowledge is relevant or not for policy planning. All of this has huge implications for the lives of people. In Israel, the loss and the disregard of local Palestinians' knowledge changed their life but also resulted in critical environmental damage and change. Addressing environmental damage and deeply problematic water resource management strategies allows justice to be achieved, for Palestinians and for nature as well.

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